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APOLOGIA

The readers of the July issue of our Journal may have viewed with some dismay the reduced size of that number, but we trust that they have not failed to observe the announcement that a printer's strike was the etiological factor. This is all the more pathetic in view of our promises made at the beginning of the year, that the enlarged Journal would in future afford much more satisfaction than in the past.

This defection on the part of the printers has likewise added, no doubt, to the disappointment of many contributors who have been naturally eager to see their papers appear promptly. We nevertheless take a special pride in announcing that in future the Journal will appear with at least sixteen more pages than in earlier numbers, as soon as the labouring class afford us the opportunity so to do. This, we trust, will enable us to give satisfaction to a larger number of contributors, will permit the earlier appearance of their papers,

and will present to our subscribers a journal which will be much wider in its scope.

It is the intention of the Executive Board of the Journal, as soon as financial conditions permit, to carry out as active a propaganda as possible on behalf of the profession, and against the illegitimate practices which are already so prevalent in this country.

An endowment fund is now being established, which we trust will place the present Journal once more upon a satisfactory basis, and enable the re-organization scheme as outlined to be carried through with every hope of success.

We crave, therefore, the indulgence of our readers until such time as the situation among the printers can be so rectified as to permit us once more to resume our normal procedure with an enlarged programme to which every member of the Editorial Board is giving his earnest attention.

THE DIAGNOSIS OF CHRONIC CHOLECYSTITIS

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MATERIAL.—This paper is based on a study of the literature on the subject, and on the observation at operation of 53 cases of chronic cholecystitis. I regret that in only 20 of these cases were the records sufficiently complete to warrant their being reviewed.

Cholecystitis is a disease of the gall-bladder caused by bacterial invasion of its walls. (1) Whether the infection ascends from the duodenum, descends from the liver, or comes in the back door by way of the blood stream as suggested by Rosenow, is as yet undetermined. Infection having gained entrance to the tissues the usual changes of inflammation take place. So we have congestion, oedema and round celled infiltration, going on perhaps to necrosis of the mucous membrane or even gangrene of the walls of the organ. Swelling of the regional lymph glands occurs, and the inflammatory process may involve the liver and pancreas. The cells of the mucosa are stimulated and the resulting over-production of mucus greatly increases the viscosity of the bile. Due to the inflammatory swelling of its mucous lining and the increased viscosity of the bile, it becomes increasingly difficult for the gall-bladder to force its contents along the cystic duct. This process may continue until the cystic duct becomes occluded. The peritoneal coat of the organ becomes roughened and adhesions form between it and adjacent structures—intestine, stomach, transverse colon or omentum. If the inflammation is chronic in character the normal blue color of the gall-bladder may be changed to pearl grey.

HISTORY.—The diagnosis of chronic cholecystitis is by no means always easy, and as yet must depend mainly on a well-taken history. There is good reason to be-

lieve that the role of typhoid fever as a causative agent in this disease has been greatly overestimated. In the 20 cases here reviewed, a history of previous infection with typhoid was obtained in only 2 cases. Focal infection, especially pyorrhoea, is a frequent concomitant of this disease. The frequency with which one meets with oral sepsis and suppuration in the accessory sinuses of the nose in cholecystitis, would seem to lend some support to the view that the infection is an ascending one from an infected duodenum. On the other hand it may be that the common infective agent in these conditions has also a special affinity for the tissues of the gall-bladder. A definite focus of infection was present in 12 of my cases when they presented themselves for examination. Regarding the nature of the infection: 3 had a chronic profuse discharge of pus from the nasal cavity, 2 had chronic pelvic infection, 1 had septic tonsils and 6 had well-marked pyorrhoea alveolaris. It is interesting to note that in the 8 cases in which no focus of infection could be found, 5 occurred in women who had borne children.

Attention has been called by Deaver and others to the frequency with which disease of the gall-bladder is accompanied by appendicitis. Oschner (2) found that more than 35 per cent. of his cases of cholecystitis were associated with either acute or chronic disease of the appendix. In 5 of my cases the appendix was removed at a previous operation and in 3 others the organ showed gross evidence of disease, either in the form of periappendiceal adhesions or stricture of the lumen.

SYMPTOMS.—Apart from the pain of biliary colic the symptoms of this disease are by no means violent in their nature. A vague feeling of epigastric distress with occasional attacks of vomiting, and the belching of gas may be the only indications in the

Read before the Winnipeg Medical Society, February 18th, 1921.

history that the gall-bladder is the offending organ. Whipple (3) in an analysis of 400 cases of cholecystitis operated on at the Presbyterian Hospital, New York, found: "that aside from the typical character and radiation of the pain in biliary colic, the most constant symptoms of gall-bladder disease are those of 'indigestion', i.e., a feeling of epigastric distress or a distended or bloated feeling in the epigastrium or left upper quadrant, and the belching of gas." This group of symptoms occurred in 78 per cent. of the cases. The above train of dyspeptic symptoms comes on commonly after meals and the "distress" varies from a slight feeling of discomfort to well-marked pain. Qualitative food dyspepsia may be present, the gastrointestinal tract showing a special intolerance for fats. Vomiting is a fairly constant symptom and was present in 14 of my cases. In one case in which a stone the size of a large cherry was impacted in the cystic duct, the patient had vomited after every full meal for two years. Only 2 cases gave a history that could be construed as biliary colic though stones were present in 11 cases. The most outstanding single symptom was the belching of gas.

PHYSICAL SIGNS.—The most constant and trustworthy sign of cholecystitis is tenderness in the region of the gall-bladder. This sign was present in all but one of my cases when examined for by the Murphy method.

While rigidity of the rectus muscle is more marked in the acute cases, a definite resistance, especially in the upper fibres of the muscle, can sometimes be made out. The presence of this resistance was recorded in 4 of my cases.

It is possible that liver enlargement as a sign of bile tract infection has not received the attention that it merits. Whipple in his case histories already referred to, states that: "a hepatitis, either in the form of a localized or contiguous inflammation about the gall-bladder and ducts, or a general involvement, a true biliary cirrhosis, was found on gross examination of the liver in 21 per cent. of the cases of cholecystitis." Graham (4) in 30 cases of bile tract infection observed at operation states that the liver was found to be enlarged in 87 per cent. of the cases. If liver enlargement is present in anything like the percentage reported by Graham in his

cases, it is obvious that the size of the organ is an important diagnostic sign in infection of the biliary apparatus. Enlargement of the liver was recorded in the preoperative examination in 3 of my cases. It was, however, found distinctly enlarged in 5 cases at operation. The greatest enlargement was observed in a case complicated by a stone in the common duct causing obstruction. The liver in this case was a hand's breadth below the costal margin and showed a well marked Reidel's lobe.

Involvement of the pancreas occurs in 36 per cent of cases of cholecystitis, either as an induration of the whole organ or of the head. (5) In thin patients with pancreatic involvement the pancreas as sometimes be felt as a mass of woody consistency extending across the upper abdomen. Unfortunately many of these patients are fat and I have not been successful in obtaining much reliable information from a preoperative palpation of the organ. The pancreas was found indurated in 4 of my cases at operation.

LABORATORY FINDINGS.—Under this heading I will include the x-ray, stomach contents and the duodenal tube.

The percentage of gall stones that can be demonstrated by the x-ray varies greatly with different observers. The estimate of 20 per cent. is, in the hands of the average roentgenologist, probably entirely too high.

The size of the gall-bladder may also occasionally be demonstrated.

The most useful field of the x-ray, however, is in the detection of pericholecystic adhesions. This was done in 7 out of 11 cases in which adhesions of the gall-bladder to adjacent structures were found to be present at operation. In no case were stones or the size of the gall-bladder shown on the x-ray plate.

Attempts have been made by different observers to interpret the gastric acidity as evidence for or against gall-bladder disease. Moynihan (6) speaks of hyperchlorhydria as an accompaniment of gall stones. On the other hand Fravel (7) in examining the stomach contents in 61 cases of cholecystitis found an excess of HCE in but 5 cases, while 45 cases showed free HCE of less than 20. Holweg (8) states that hypochlorhydria is an important sign of cholecystitis, and that

it is present in from 71 to 84 per cent. of cases. Bassler (9) divides his cases of cholecystitis into clinical types, some of which have an increase in the gastric acidity, while in others it is diminished or normal.

In my own cases the results were so variable that no definite conclusions could be drawn. Some of the cases with repeated examinations showed hypoacidity at some and hyperacidity at others. I think one is safe in stating that examination of the stomach contents as ordinarily conducted is useless; as far as the diagnosis of cholecystitis is concerned. Further use of the fractional method may lead to something more definite.

Considerable prominence has recently been given to the use of the duodenal tube in the diagnosis and treatment of cholecystitis. Bassler in speaking of its use states that some of the most perfect samples of normal returns have come from cases in which operation proved the presence of markedly diseased gall-bladders, gall-stones and even obstruction, and that in the average gall-stone case it is quite useless. The possibilities of contamination are so great that conclusions drawn from a bacteriological examination of bile obtained with the duodenal tube seem valueless. Moreover, assuming that the bile has been obtained from the gall-bladder and that it is infected, we have by no means established a case of cholecystitis.

If we found infected material in the lumen of the appendix we would not accept the finding as proof of appendicitis; nor if we found infected urine in the urinary bladder would we be justified in making a diagnosis of cystitis. If infected material can exist in other mucous lined cavities without setting up inflammation, why not in the gall-bladder also?

The procedure is as yet too new to state definitely its value. It has possibilities and little more can be said about it.

DIAGNOSIS AT OPERATION.—In the great majority of cases of cholecystitis the condition is obvious on opening the abdomen. The presence of stones, a thick walled sclerotic gall-bladder, pericholecystic adhesions with perhaps some liver enlargement or induration of the pancreas leave no doubt in the mind of the operator. However, it is

well recognized that disease may exist in a gall-bladder which, on external examination appears normal. In doubtful cases the regional lymph glands should be palpated. There are two or three glands along the course of the cystic duct and three or four along the hepatic and common ducts. Those along the common duct drain the duodenum and pancreas. In inflammation of the pancreas the bile tract is usually involved. Mayo (10) states that "given sufficient symptoms for surgical intervention, if these glands are swollen without other adequate cause, as from diseased duodenum, pancreas or general abdominal infection, the gall-bladder should be removed, whether or not stones are present." Lilienthal (11) recommends aspiration of the gall-bladder with a hypodermic needle. If the aspirated bile is of a deep greenish color, with a great increase in the mucus, or if granules are present he states that the gall-bladder should be removed even if it appears normal. This test has the disadvantage that it is often impossible to get the stickyropy bile that is so often present in cholecystitis to flow through the aspirating needle.

Regarding the treatment in these 20 cases, I simply wish to state that the gall-bladder was removed in every case. Appendectomy was also done in all cases in which the appendix had not been removed at a previous operation. There were no deaths in the series.

CONCLUSIONS.

1. The history and clinical findings still remain by far the most important factors in the diagnosis of cholecystitis.

2. The most outstanding single symptom of chronic cholecystitis is the belching of gas.

3. Tenderness in the region of the gall-bladder is the commonest and most trustworthy physical sign of cholecystitis.

4. In doubtful cases the physical examination of the liver and pancreas may be of assistance in making the diagnosis.

5. If at operation the gall-bladder appears normal, the regional lymph glands are not involved, and the aspirated bile does not on gross examination differ widely from the normal, operative interference is not justified even if the bile be shown to be infected.

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GENERALIZED NEUROFIBROMATOSIS

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THIS disease is not frequently seen in practice. The writer has a recollection of only two cases that have come under his observation. One was the cutaneous form in a middle-aged soldier in the service of Lt.-Col. J. G. Johnson, C.A.M.C., at Bramshott. The other was one of the nervous form in a young girl from the country in Manitoba. The latter was of such unusual interest that it is considered worthy of publication.

Anna S., a Polish girl, seventeen years of age, was admitted to my service in the Winnipeg General Hospital on July 23rd, 1920, having been brought in by her father from a farm in Manitoba.

Complaints on admission. "Poor eyesight and trembling fits at night." Duration five months.

Personal History. Patient was born in Poland seventeen years ago. Two or three years after her birth her parents noticed that her left arm was smaller and shorter than the right. She had been born in normal labour; forceps were not used. She was the second child of a family of seven. When she was a year old her parents emigrated to Canada. As she grew up her parents noticed an increasing disparity in the size of the right and left arms, that the left was weaker

than the right, and that there was little or no prehensile power in the left hand. She gradually learned to lift and carry light articles from her left elbow which could be fairly firmly flexed. At eight years she began school and continued her studies for four years with apparently average progress. Four or five years ago her father took her to the Rochester Clinic to see if anything might be done for her arm. He was told that nothing could be done.

As to other illnesses, she suffered some indefinite injury to her right foot some five years ago. During the winter of 1919-20 she had a mild attack of Influenza. She has never menstruated.

Family History. Father and Mother are in good health. There are two sisters and three brothers, all younger than patient, who are apparently normal in all respects. The oldest child of the family died at the age of five years after six weeks' illness with chest trouble contracted en route to Canada. There is no history of any nervous diseases on either side of the family with the exception of a paternal aunt, who had left sided torticollis from birth. Patient's mother never had any miscarriages.

History of Present Illness. For the past

year or more, patient has been having frequent headaches and sometimes she has vomited. Her eyesight has been failing for the past five months and more rapidly during the past two months. She has also had a gradually progressing deafness in the right ear which began about two years ago. She frequently has "shaking and trembling" attacks at night. She complains of giddiness when she attempts to walk.

Present Condition. Patient is a girl of moderately good nutrition. Her skin is of a somewhat bronzed hue. Her mentality is good and she answers questions intelligently. Her attitude is one of mild apprehension.

Face. The facial expression is pleasant, but somewhat vacant. The right eye is somewhat more prominent than the left and both eyes appear to be gazing vacantly into space. There is evidence of slight paresis in the right side of the face. There is a small subcutaneous lump about the size of a bean, raised above the surface level, in the region of the right supra-orbital ridge. It is moderately hard in consistency, freely movable, and not attached to the deeper tissues. About an inch lateral to the right eye there is a small epidermal excrescence and in the locality of the right mental foramen there is a similar one.

Eyes. Both pupils are rather large, the right more dilated than the left. Under a concentrated ray of light the right pupil contracts a little, but quickly rebounds to its original size. The left pupil does not respond to light at all, but there is consensual reaction in the left when the right is made to respond. The right eye is only capable of vague perception of large objects. The left eye is totally blind. There is no nystagmus. The right palpebral fissure is larger than the left and the left eye less prominent than the right. There is no paresis of the external ocular muscles. There is neuro-retinitis of both eyes with advanced secondary optic atrophy in the left and a lesser degree of optic atrophy in the right. In the latter it is more marked on the temporal side of the disc. Large objects can be seen in the temporal field of the right eye only.

Ears. The right ear is markedly defective in the perception of sound either by air or bone conduction. No evidence of previous

otitis media. There is good hearing in the left ear.

Mouth. There is some prominence of the lower lip on the left side. The hard palate is high and vaulted.

Neck. There is a nodule in the posterior triangle of the neck on the right side, similar in character to the right supra-orbital one. The thyroid gland is abnormally prominent with bilateral and symmetrical enlargement. It is moderately soft in consistence and rises with deglutition.

Trunk. The thorax is somewhat undersized, long and narrow. The breasts are quite well developed and over the right one there is a deeply pigmented area with irregular outline, two inches in diameter. Below this there are several subcutaneous small nodules the size of a bean. There is a similar nodule in the abdominal wall of the right hypochondriac region. There is also on the abdomen a small warty growth to the right of the umbilicus.

Upper Extremities. The left arm is smaller and shorter than the right. The right shoulder is well developed and rounded; the left is lower than the right and the left scapula and scapular muscles are considerably smaller than the right. The muscles of the small left arm function well as far as the wrist, but the extrinsic and intrinsic muscles of the small left hand are atrophic and there is no grasping power. The right arm is normal and well developed. About the centre of the infraspinous portion of the left scapula there are two small moderately hard subcutaneous tumours, one being the size of a small walnut, the other the size of a bean.

Lower Extremities. There is some difference in the size of the muscles on the two sides, the right lower leg being somewhat smaller and showing a tendency to ankle-drop. There is a small subcutaneous nodule in the medial aspect of the middle third of the right thigh. It is fairly hard and freely movable. Pressure upon this provokes pain in the right knee. There is normal movement in the left ankle, but there is limited dorsiflexion of the right foot and there is diminished power of extension of the right toes. All other muscular functions of the two legs are normal, the strength being equal on the two sides.

Sensation. Sensation is undisturbed in the

lower extremities, the trunk, the face, and the right arm. There is hypaesthesia and hypalgesia in scattered areas of the left arm.

Reflexes. (a) Superficial. The right epigastric is absent, the left one present. Both upper and lower abdominal reflexes are normal. Plantar reflexes are both normal.

(b) Deep. Both knee-jerks and ankle jerks are normal. Supinator jerk is present on the right side, but elicited with difficulty on the left. (c) Organic reflexes are normal.

Co-ordination. There is slight tendency to Rombergism, but no inco-ordination of hands and legs. There are no tremors, involuntary or volitional.

Viscera. Thoracic and abdominal viscera apparently normal in all respects.

Blood-pressure. Systolic 115, diastolic 60.

Temperature, pulse and respiration normal.

Urinalysis normal in all respects.

Cerebro-spinal fluid.

Increase of pressure (slight).

Increase of globulin content.

Increase of sugar content.

Cells normal.

Blood-counts normal in all respects.

Wassermann negative.

These data having been assembled, one of the subcutaneous nodules in the left infra-spinous scapular region was excised under local anaesthesia and sent to the pathological laboratory for examination, where it was pronounced to be "soft fibroma."

Diagnosis. Generalized Neuro-fibromatosis, probably congenital in origin.

The distribution of the growths in relation to the signs and symptoms may be explained in the following manner of localization.

(1) Central neuromata or neuro-fibromata involving each of the optic nerves and the right auditory nerve, and very slightly the right seventh nerve.

(2) Peripheral neuro-fibromata of the face, body, and extremities.

(3) A plexiform neuroma involving the cervico-brachial plexus and cervical sympathetic nerves of the left side close to the cord.

A "follow-up enquiry" six months after the observation of this case elicits the following reply from her father. "Her general health is much the same, but she cannot see at all now, and is not able to walk. At times

she shivers at night and becomes so weak that we have to go to her assistance. I see no hope of her recovery."

The salient points of the case are (1) the absence of a familial or hereditary history of similar diseases, (2) the scarcity of surface tumours and the prevalence of subcutaneous and central ones, (3) the progressive character of the lesions, (4) the combination of central and peripheral tumours, the latter causing symptoms earlier than the former, (5) the dwarfing of the left arm as a result of disturbed innervation, (6) the enlargement of the thyroid, (7) the hopelessness of any known therapeutics to eradicate or to arrest the progress of the disease.

In reviewing the literature of generalized neuro-fibromatosis, one is astonished to find such sparseness of material as exists. Text-books refer to it in terms of glittering generalities. Neurological journals are almost silent. Very few cases have been reported. E. Christin and F. Neville report a case from Geneva in the *Annales de Medicine*, Paris, July 1920, in which thirty one intracranial tumours were found post mortem in a man 39 years of age, these tumours being very variable in structure and including gliomas, fibromas, neuromas, myxomas, osteomas, endotheliomas, and sarcomas. The patient at 17 had become suddenly completely deaf after sudden vertigo and a fall, but from that time to the age of 39 he had no other symptoms. L. H. Anderson also reported a case in the *Journal of the American Medical Association* of April 10, 1920. The patient was a woman of 38 with 3000 countable lesions on and below the skin surface. The right olfactory, oculo-motor, trigeminus, facial, and the cochlear branch of the 8th cranial nerve, appeared to be involved. Her perception of light remained only on the right side, dating from the age of six or thereabouts and coincident with the first tumour mass noticed. Left fundus and visual field normal, right fundus showing merely a small pale atrophic disc with no oedema or change in the retinal vessels. Right bulb proptosed. Nerve deafness in the right ear began a year after onset. J. A. Hutchison of Montreal also reported a case, details of which are not here available.

It is stated that only twenty-three cases of central neurofibromatosis are on record

and that in 16 of these the first symptoms had appeared before the age of twenty and that intervals up to thirty-five years had passed without further disturbance. Central complete deafness is the hall-mark of the disease. Of the twenty-three cases of central neurofibromatosis, about two-thirds showed

cutaneous lesions as well. Familial and hereditary influences were variable in their incidence.

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FRAGILITAS OSSIUM

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ON the subject of fragilitas ossium, I have been unable to find much discussion in the medical literature. From the following history one would not only conclude that there is a marked hereditary tendency in this rare condition, but the tendency is for it to be transmitted by the females and to be manifested in the males.

In the past 10 to 12 years several male members of the family here referred to have been patients in the wards of the Winnipeg General Hospital. The clinical, and radiographic features have in each case been noted but have not been collected for publication. Since there have been upwards of 35 fractures, many of them still un-united, on the male side of the family, with a total absence of fracture on the female side; I would consider the history of sufficient interest to the profession to find a space in your columns.

J. W. a public ward case, age 35 years, apparently in the best of health except for the condition to be described, was born in North Dakota, the second boy in a family of eleven. He was brought up on a farm until 14 years of age, and at this age he claims to have been able to take a man's place at any variety of farm work. He never took an active part in athletics such as football, baseball, etc.

Present Complaint. Inability to get about because of un-united fracture of right femur of 19 years' standing. He was admitted to the Winnipeg General Hospital, April 21,

1920, suffering from a fracture of the surgical neck of the right humerus.

Past Illnesses. No serious illness at any period of his life, exclusive of fractures. He has been singularly free from ordinary childhood diseases. Mentality good, rather mechanical turn of mind.

Family History. Father, age 60 years, alive and well except for fracture disability to be outlined later. Mother alive and well, exceptionally active for a woman of 60 years, who has been the mother of a large family. Seven brothers all alive, five of whom have a multiple fracture history, with mal or non-union. Four sisters, three alive, one accidental death. No fractures in the cases of any of the girls.

Patient's Fracture History. 1. Fell off a building when 10 years of age, fractured the right humerus. Had arm in sling for three weeks. Had good use of it in six weeks.

2. In Feb. 1901, he fell off a toboggan, and fractured the left femur about the junction of upper and middle third. Four months after he was able to do manual labour, no disability other than slight stiffness of the knee.

3. In Jan. 1902, he fell while skating on the river, fractured the right femur, upper third. This fracture is still un-united in spite of operative and other surgical treatment.

4. April 1921, fractured surgical neck of right humerus which was considerable loss of function.

Fracture History of Family. Seven boys in the family, five of whom have had several fractures of both upper and lower limbs. Patient said "I can't tell you off-hand how many, but all of them are worse off than I am."

1. Eldest brother has fractured both femurs 2 or 3 times, has also broken his right arm. He has been an invalid for 12 years, because of un-united fractures of both femurs. His fracture history began when he was 8 or 10 years old.

2. Second Boy—is the patient described.

3. Third Boy—fractured the left femur 12 years ago. It is still un-united. He had a bone graft done several years ago, but without result. In 1901 he fractured the right arm but got union. He now gets about on crutches.

4. Fourth Boy—never any fractures.

5. Fifth Boy—robust fellow, works on telephone repair gang, has had several falls, never any bones broken.

6. Sixth Boy—has had at least 5 or 6 fractures of both legs and arms, all of which have united and are useful, except the last femur fracture 5 years ago, which has not firmly united (probably fibrous union). He gets about with support of a leg splint. Is very lame. Is engaged as assistant to father in a shoe-repairing business.

7. Seventh Boy—now about 21 years of age. Has had the most unfortunate history of all. Has had 8 fractures of arms and legs that patient knows of, perhaps more. Both femurs un-united. Gets about on a wheel chair.

The Father—is 60 years of age, has had three fractures. Eighteen years ago he fractured his right femur, and ever after endeavoured to induce union failed. The thigh was eventually amputated in this hospital 12 years ago. Previous to this he had had fractures of both tibia and fibula, but union took place.

The Mother—is 60 years of age. The patient states there are very few women of her age who can do the work she does. She has had one fracture, as the result of falling on a galvanized pail.

The patient states there have been no miscarriages or abortions in the family to his knowledge. One of the brothers with a negative fracture history, is the only one who

has had venereal disease so far as we can ascertain. The patient's Wassermann is negative.

Father's Sisters (3)—personally never any fracture trouble. One of the sisters has three boys, all of whom have fracture tendency. The other married sister has a family of girls, none of whom have had any broken bones.

In the case of the brothers who are married, there are boys in each family, but all are too young to expect trouble as yet. The sisters we noted were free from fracture history, but their sons have had fractures.

Flesh wounds heal normally as is seen by scars and operative histories. At the present time, two of the maimed brothers are in this city, and under observation. Two others are in a country town. They are engaged in a machine repairing business, and it is quite a novelty to see them get in wheel chairs to do their work.

REFERENCES FROM ADAMI & MACRAE'S PATHOLOGY, P. 1059

"The etiology of the so-called 'idiopathic' or primary fracture is quite obscure. It comes on quite early in life, and may be congenital. The disease also runs in families. Apparently there is an insufficient apposition of bone, though the normal process of resorption is not interfered with. The result is a rarefaction of the bones which predisposes to fracture on the slightest provocation. Looser, regards it as an osteogenesis imperfecta tarda and osteogenesis perfecta. However, this is by no means clearly made out.

"As a consequence of the excessive resorption of the more solid portions the bones become brittle, and unable to support their accustomed burden and may readily fracture."

Mr. Cameron, assist. prof. of physiology in the University of Manitoba has made an exhaustive chemical urinalysis of a 24 hour specimen and this showed Calcium content to be high. We hope at a later date to report as to the exact chemical analysis of the bone substance (especially the femurs), since the histories would suggest that femurs in each of these cases are the most deficient in reparative power.

MULTIPLE POLYPI IN THE STOMACH (GASTRIC POLYPSIS)

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Toronto

THE following case came under observation recently. A woman aged about 50, no children. She has never been robust and has had many anxieties connected with outside affairs as well as with her household duties. For years her appetite was indifferent and she had daily discomfort in the epigastrium after meals. The bowels seldom acted without laxative drugs. As a result of all these causes she was weakly and nervous. Sleep was light and easily disturbed. She was thin and worn looking. The abdomen was flat and rather rigid. There were tender areas in various parts, shifting from time to time, not persistent in any part,

not even in the epigastrium in which nothing abnormal was to be felt. The various reflexes were over active.

There was nothing abnormal to be found connected with the lungs and heart. The urine was rather scanty and concentrated but she drank little water. Gastric contents an hour after some food consisted of a little almost clear mucus, quite anacid. No food or blood were present.

A period of rest under capable nursing care appeared essential to her improvement but before entering upon such a course it was decided to have an x-ray examination made of the gastro-intestinal tract to make sure there were no signs of ulcer or chronic appendicitis. Observation immediately after the barium meal showed a remarkable scolloping along the greater curvature throughout its entire length. (Fig. 1) Six hours later, about one-third of the meal was still in the stomach. In addition to the irregular greater curvature there were two or three oval areas appearing through the barium and on moderate pressure, other areas were seen doubtless due to the polypi on the anterior and posterior surfaces of the stomach coming into contact permitting the rays to penetrate and become apparent on the screen. (Fig. 2) The polypi evidently existed over all parts of the mucous membrane from the cardiac orifice nearly to the pylorus but they did not obstruct the latter. Their presence throughout the whole stomach precluded the possibility of relief by surgical means.

She was placed under good nursing care, with as liberal a diet as she could take and given hydrochloric acid and strychnine



FIG. 1

Presented at the session of the Association of American Physicians, Atlantic City, May, 1921.

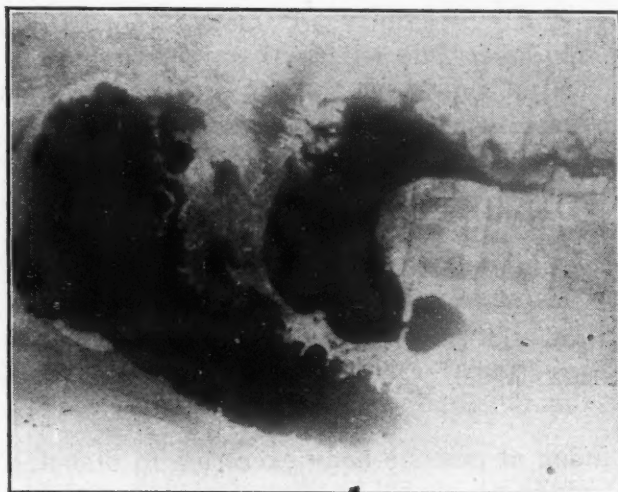


FIG. 2

freely with but little improvement, after two months of such care. The prognosis is of course unfavorable but depends much on her care and the degree in which her nutrition can be maintained.

The rarity of the disease is indicated by the fact that only two cases are on record in America. The first was reported in the *Journal of the American Medical Association* Vol. LXI, 1913, by J. A. Myers. In this case, a mass of polypi obstructed the pylorus. The mass was removed, but unfortunately the hemorrhage could not be completely arrested and death occurred three days later. The second one was seen by D. C. Balfour of the Mayo Clinic, the first occurring in their large clinic. (*Surg. Gynec. obstet.* 1919, Vol. XXXVII 465). Also by Carmen and A. Miller, *Roentgen Diagnosis of Disease of the Alimentary Canal*, 1920).

The polypi were disposed in irregular rows and varying in size from 0.5 to 2.0 cms. Their surfaces were smooth containing

no glands. Their pedicles are thick, made up of greatly hypertrophied mucous membrane, muscularis mucosa, and a loose connective tissue core from the submucosa and contained fairly large arteries and veins. The depressions between the polypi consisted of mucous membrane in deep folds. (Fig. 3.) There was an abundant secretion of mucous, antacid, and without digestive property.

There is nothing in clinical history or physical examination of such cases on which to establish a diagnosis—all the symptoms occur in various organic and functional conditions. In advanced cases there may be *hanematemesi* and a sense of resistance over the stomach, especially the pylorus, the part most commonly affected. If lavage is done and tissue particles or polypi found, they would be an indication of the condition. Fortunately, however, an x-ray examination gives us the aid necessary to permit of an early and certain diagnosis being made.

I have pleasure in acknowledging the kind assistance of Dr. W. H. Dickson, chief radiologist for gastro-enteric diseases in the Toronto General Hospital, who made the first and second illustrations, and offered valuable advice in the diagnosis.

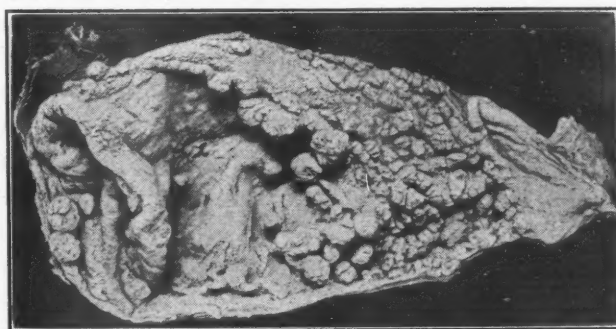


FIG. 3

(From Ewing's *Neoplastic Diseases*, page 631)

A SIMPLE METHOD FOR DETERMINING THE APPROXIMATE DEGREE OF ACIDOSIS IN DIABETES MELLITUS*

THE TITRATION OF ORGANIC ACIDS IN URINE, VAN SLYKE & PALMER

I. M. RABINOWITCH, M.D.

LABORATORY methods described as aids to clinical diagnosis, become so, chiefly, when the technique involved is simplified to such a degree as to make the methods possible as a routine daily procedure rather than a special occasion.

The determination of the amount of acid excretion daily in a diabetic patient with acidosis, is certainly one of the most important laboratory reports the clinician may call for. The present most common method in use for determining this, is the gravimetric method of Van Slyke (1917). It is, however, time-consuming and complicated. Judging from the current literature on Diabetes Mellitus, this test is not employed as a routine daily procedure. In its place the amount of "acetone bodies" excretion is judged by the reaction of Ferric Chloride and the results obtained are reported in terms of plus, two plus, etc. This is, however, only a qualitative method.

In April, 1920, Van Slyke and Palmer (1), reported a method for titrating the organic acids in the urine. The method is simple and requires less than fifteen minutes. In comparing the results obtained by this method and by determining the actual total acetone bodies in the urine, acetone, aceto-acetic and B-hydroxybutyric acid, they showed that a remarkable parallelism is found. From the results obtained they point out that it appeared that:

(a) 95 to 100 per cent. of the organic acids titrated represents the total organic acids present.

(b) A rise above the normal output of organic acids may be used as an approximate

index of acetone body excretion in diabetes

(c) Organic acid bodies other than acetone bodies are not excreted in significant amounts in diabetes and therefore,

(d) "the easily performed organic acid titration may be used for approximate estimation of the acetone bodies in diabetic urine."

During the past year nearly one thousand such determinations have been made in The Montreal General Hospital. This test has become a routine daily procedure in all diabetics, with or without acidosis.

The technique as described by Van Slyke and Palmer is as follows:—

"100cc. of urine, roughly measured are thoroughly mixed with 2 grams of finely powdered calcium hydroxide, allowed to stand about 15 minutes with occasional stirring, and then passed through a dry folded filter. This treatment removes carbonates and phosphates. To 25cc. of the filtrate in a 125 to 150 cc. test tube of clear glass, one adds 0.5 cc. of 1 per cent. phenol phthalein solution, and 0.2 N hydrochloric acid from a burette until the pink colour just disappears. 5cc. of 0.02 per cent. tropeolin 00 solution are then added. As the indicator solution is added it is thoroughly mixed with the urine by shaking the tube; if this precaution is omitted some of the tropeolin 00 may be precipitated. Finally 0.2 N hydrochloric acid is added from the burette until the red colour equals that of a standard solution containing 0.6 cc. of 0.2 N hydrochloric acid, 5 cc. tropeolin 00 solution and water to a total volume of 60cc. When the end point is approached sufficient water is added to the titrated solution to make its volume equal to that of the 60cc. standard solution used in a similar tube as a colour control.

*From the Dept. of Metabolism of The Montreal General Hospital.

Calculation: From the volume of 0.2 N HCl used to titrate from the end point of phenol phthalein to that of the tropeolin 00 the amount is subtracted which is utilized in a similar titration of a control determination in which water is substituted for urine.

In order to calculate the results in terms of cc. 0.1 N organic acid per litre, the figure representing the cc. of 0.2 HCE used in the titration is multiplied by 80, i.e. $(1000 \div 25 = 40)$ in order to transfer figure from 25cc. to 1000cc. of urine, and by 2 to change from 0.2 N to 0.1 N terms.)

From a practical clinical point of view these are the essentials of the test.

Theoretically, and for absolute accuracy, as these authors have shown, corrections should be made for creatinine, creatine, and amino acids, which are included in the results obtained by the above method.

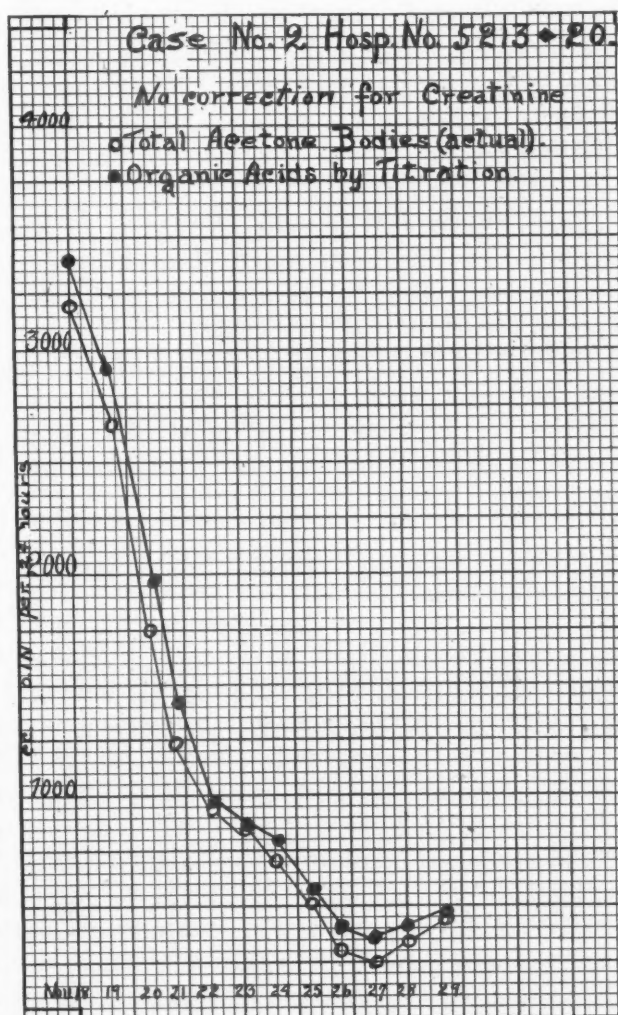
The following are charts, all of diabetics admitted to the Montreal General Hospital with varying degrees of acidosis. Their progress was noted by the daily determination in the urine of acetone and diacetic acid qualitatively (Nitro prusside and Ferric chloride test), quantitative determinations of titratable acid, titratable acid plus ammonia, total acetone bodies, total organic acids (by the method described) and ammonia. The plasma CO₂ combining power (Van Slyke) was determined every third or fourth day as the clinical or other laboratory findings indicated.

It will be noted that in Case 1, corrections were made for creatinine daily. In Case II no corrections were made for creatinine whatever. In Case III daily corrections were made for creatinine, but no "blank (water)" corrections were made. In Case IV no corrections were made either for "blank" or creatinine. In Case V the creatinine excretion was determined on the first day of observation and this figure was accepted daily for correction. The latter method is employed at the present time in the routine of this laboratory.

By plotting a curve, the abscissae for the dates, and the ordinates for the quantity of excretion of total acetone bodies and organic acid in terms of 0.1 N cc. per 24 hours, the remarkable parallel results are noted in all the above charts, in spite of the variations

employed in the method. This apparently proves that for practical clinical purposes, the technique as described by Van Slyke and Palmer as given above, (without corrections for creatinine, thus making the method still more simple), is an accurate index of the course of a diabetic acidosis.

Occasionally, a discrepancy occurred when the two methods were compared. The total amount of actual acetone bodies was found to be greater than the total organic acids present as determined by the new titration method. This the writer is unable to explain.



This occurrence was, however, very uncommon, and when it did occur as shown in Chart 1, days 12 and 13, the results did not differ markedly enough to alter the clinical value of the test.

Although the advantage of employing this method becomes quite apparent, it nevertheless, in no way, minimizes the importance of determining the qualitative reaction for

"acetone bodies" daily by the Ferric Chloride method. In fact its daily performance is essential in interpreting the results obtained by this new titration method. This must be emphasized for two reasons:—

(a) The Ferric Chloride is the most practical and the most generally applicable test we have.

(b) As pointed out by the authors of this test and as shown in Chart 3 beginning on the 9th day, it is not the total figures obtained, but the rise above the normal figures, that gives an index of the degree of acetone body excretion found in diabetes.

It is therefore necessary to perform the Ferric Chloride Test daily. When the latter becomes negative it may safely be assumed that the organic acids found represent the normal excretion. The average normal excretion is about 500 cc. 0.1 N.

Judging from the current literature, little consideration has been given this practical valuable test. It is for this reason that this paper is presented for publication. Especially, in view of the fact, that only qualitative analyses are reported, the more accurate quantitative methods being apparently regarded as time consuming and therefore not employed.

CASE 1. Hosp. No. 4750-20. Male, Age 35. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Crea-tinine cc. 0.1 N
Oct. 20.	2620	3000	33	47.6	220
22.	1960	2204		46.5	260
22.	1640	1804		46.8	190
23.	1510	1710	48	46.9	210
24.	1430	1640		47.0	66
25.	Total Urine?		51	47.8	110
26.	1170	1580		48.2	120
27.	1260	1476	58	47.0	70
28.	640	870		46.3	86
29.	530	650		48.0	92
30.	390	430		46.3	60
31.	1060	860	58		76
Nov. 1.	960	710		49.3	84
2.	710	860		51.1	120
3.	1120	1200		52.0	60
4.	960	860	60	51.8	98
5.	620	720			86
6.	430	620		51.0	

CASE 2. Hosp. No. 5213-20. Male, Age 11. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Crea-tinine cc. 0.1 N
Nov. 18	3226	3420	31	31.1	
19.	2630	2860		30.6	

20.	1760	1960	36	33.9
21.	1240	1416		31.7
22.	920	960	40	33.8
23.	810	860		32.2
24.	714	800	46	31.1
25.	510	520		
26.	310	380	52	30.4
27.	260	360		30.0
28.	360	410		29.8
29.	420	460	60	29.1

CASE 3. Hosp. No. 4887-20. Female, Age 19. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Crea-tinine cc. 0.1 N
Oct. 28.	1860	2030	46	57.2	116
29.	1700	1910		57.4	82
30.	1520	1630	49	57.1	70
31.	1110	840		57.7	96
Nov. 1.	860	610	58	57.7	84
2.	920	620		57.5	68
3.	410	360	60	57.0	72
4.	710	896		57.0	84
5.	120	520		57.1	66
6.	60	620		57.	64
7.	52	410	61	57.	59
8.	49	360		57.1	86
9.	76	480		57.2	72
10.	84	620	60	57.1	63

CASE 4. Hosp. No. 4824-20. Female, Age 22. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Crea-tinine cc. 0.1 N
Oct. 24.	4240	4020	40	42.2	
25.	3416	3640		40.0	
26.	2340	2620	50	39.8	
27.	1360	1600		40.0	
28.	710	810		39.1	
29.	640	762	56	39.4	
30.	790	860		39.5	
31.	416	516		37.9	
Nov. 1.	520	616	60	42.6	

CASE 5. Hosp. No. 2985-20. Diabetes Mellitus.

Date.	Total Acetone Bodies cc. 0.1 N	Total Organic cc. 0.1 N	Plasma. CO 2. vol. per cent	Weight Kgms	Crea-tinine cc. 0.1 N
July 3.	2520	2620	48	54.7	116
4.	1960	2160		55.2	
5.	1800	1820		55.0	
6.	1460	1600	55	54.7	
7.	1180	1260		55.0	
8.	860	980		54.2	
9.	810	1020	54	55.9	
10.	760	960		55.6	
11.	640	720		54.7	
12.	1090	1400	50	55.0	
13.	460	640		54.7	
14.	810	820		53.4	
15.	620	760	57	53.4	
16.	540	614		53.5	
17.	630	780		53.9	
18.	420	690	60	54.4	
19.	200	320		54.5	

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THE BACTERIOLOGY OF INFECTIOUS DIARRHOEA*

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ORGANISMS belonging to the dysentery group of bacilli have been isolated from the stools of infants suffering from "summer diarrhoea" as long ago as 1902 by Duval and Bassett (1), and again, in 1903, by Wollstein (2). The name "summer diarrhoea" naturally includes all diarrhoeas occurring in the warm months, irrespective of etiological factors. Such diarrhoeas may be caused, in general, by two conditions—first, acute infections of the intestinal tract, and second, the result of some chemical disturbance.

According to the present terminology, infectious diarrhoea is the type representing acute infections. These cases are very definite clinical entities, and can be recognized by their more or less sudden onset, accompanied by a febrile reaction. The stools, in a remarkably short time, show the presence of blood, mucus and pus.

It is from this type of case that the dysentery bacilli have been isolated. In looking over the literature, cases of simple diarrhoea in children have never been proven to be due to a dysentery bacillus. Davison (3) in 1920, cultured stools from sixty-three cases of simple diarrhoea in infants and young children, and in no instance did he isolate a dysentery bacillus. The stools of these cases were mainly faecal in character, and at no time contained pus. The stools of twenty infants suffering from a fermentative type of diarrhoea were cultured during the summer of 1920 in the laboratory of the Hospital for Sick Children. No organisms resembling dysentery bacilli were isolated, although repeated cultures were made in many instances.

From time to time since 1902, various workers have isolated other organisms,

which they have suggested as causing an acute ileo-colitis in children. Some observers (4 & 5) have laid stress on the presence of *Bacillus aerogenes capsulatus* as a factor in its production. This organism has, however, been repeatedly demonstrated by Knox and Ford (6) in 1915, and by Davison (3) and others, as an inhabitant of apparently normal gastro-intestinal tracts of infants and young children. It seems unlikely, then, that this organism is in itself the primary cause.

In 1906, Morgan (7), an English writer, in a series of fifty-six cases, isolated a non-lactose fermenting bacillus in twenty-eight. This organism, showing certain definite reactions on sugars, he named *Bacillus Morgan* No. 1. Later, in feeding experiments on animals, he succeeded in producing a diarrhoea, and subsequent death, in eighteen. This organism was for some time credited, especially in England, as being the possible cause of infectious diarrhoea in a certain percentage of cases. Davison (3), however, has isolated it repeatedly from the stools of cases of ordinary diarrhoea, as well as from the stools of normal healthy children. It has also been observed that this organism is frequently found in conjunction with one of the types of dysentery bacilli in infectious diarrhoea, more often towards the end of the disease. One case of this type was observed in this series last summer in our laboratory. The case entered hospital on the sixth day of the disease. Repeated cultures made daily from admission until the death of the child failed to reveal the presence of a dysentery bacillus. Morgan's bacillus, however, was isolated shortly before death. At autopsy, the characteristic pseudo-membrane lining the large bowel and ileum was demonstrated. As the result of serological tests, it was never possible, in any instance, to demon-

*From the Wards and Laboratories of the Hospital for Sick Children, Toronto.

strate agglutination of the organism by the patient's serum. Hence it is reasonable to assume that bacillus Morgan No. 1 plays a very small part, if any, in the etiology of this disease.

Womack (8), in 1919, suggested as a cause a highly virulent colon bacillus, but as yet there is no evidence to favour such an assumption. Other organisms which have been suggested as causative factors, are the streptococcus and bacillus pyocyaneus. Both of these organisms have been repeatedly cultured from the stools of healthy children, and also adults. At the present time, there is no conclusive evidence that they are of pathological significance in the intestinal tract in such cases.

So that, at present, the only organisms which have been isolated from the stools of cases of infectious diarrhoea, and which have not been found in the intestinal flora of healthy children, are the members of the dysentery group of bacilli.

During the six months, from June 1st, 1920, until the end of November, the stools of twenty-nine cases of infectious diarrhoea were investigated as a routine measure in the Bacteriological Laboratory of the Hospital for Sick Children. All these cases were of the type which suggested an acute infective process, the stools containing, in each instance, blood and mucus, as well as pus—either macroscopic or microscopic.

Stools were examined as far as possible daily, until it was proved definitely that a dysentery organism had been isolated. The length of time elapsing between the onset of the illness and admission to hospital varied from a few hours to fourteen days. In the cases of long duration, when the stools were not obtained until late in the disease, the causative organism was much more difficult to isolate, and, in a number of cases, was not found.

The technique employed was as follows: Cultures were always made as soon as the stool was obtained. A small portion of mucus containing blood and pus cells was first washed in sterile saline, and then broken up in a few drops of fresh saline. One loopful of this was used to streak two plates of Endo's media. The plates were incubated for eighteen hours, after which time, the white colonies were picked and transferred

to glucose agar to determine whether the organisms were gas-producing or not. If they were gas-producing, they were discarded; if not, smears were made, and the organisms cultured on triple sugar media. At this stage, a tube of plain broth was inoculated to determine the presence or absence of motility. If, after incubation over night, the organism proved to be a gram negative non-motile bacillus, producing a red butt and colorless slant on the triple sugar media, it was classed as belonging to the dysentery group. Fermentation tubes of Dunham's peptone solution containing one per cent. of the following sugars were inoculated—glucose, mannite, lactose, maltose, saccharose, dextrin and inulin. The type was determined according to the reactions on the sugars.

By this procedure, out of the twenty-nine cases studied, eighteen yielded positive cultures of dysentery bacilli—that is sixty-two per cent. Had standard strains of dysentery bacilli been available at the time a large percentage of the remainder would undoubtedly have been proven to be of similar origin by serological tests.

Of the eighteen strains so isolated, sixteen proved to be of the Hiss-Russell type, that is, fermented only glucose and mannite. The remaining two were of the Flexner type—that is, fermented maltose, saccharose and dextrin, in addition to glucose and mannite. These reactions on the sugars were observed shortly after the organism had been isolated from the stool. Subsequent examination shows that they are not constant on the same sugars. A certain number of the Hiss-Russell strains after several months showed some change on maltose and dextrin, as well as glucose and mannite. The two Flexner strains have remained constant.

From these results, it would appear that the organism responsible for the majority of the cases is of the Hiss-Russell type. It does not follow, however, that this type is always the most common. It is quite probable that, during the next summer, or during the past summer in other centres, some other type, such as the Flexner, or even the non-mannite fermenting Shiga would be predominant.

Direct smears stained by Gram's method were examined from every specimen cul-

tured, and a report made as to the presence of pus cells and the types and numbers of organism seen.

In stools obtained from cases early in the disease, the picture seen on direct smear was almost typical, and could undoubtedly be used to advantage in the diagnosis of a dysentery infection. There were always pus cells present. The total number of organisms seen was always surprisingly small, and the predominating organism almost invariably a Gram negative bacillus. In addition, there were usually seen Gram positive cocci arranged in pairs, or occasionally in short chains, and a few large Gram positive bacilli. In the ten cases of this series which were admitted on or before the fourth day of the disease, the descriptions of the direct smear in each case showed the above characteristics.

The direct smears from the later cases were not so typical on account of the influence of diet on the intestinal flora. In cases admitted late in the disease, the picture was entirely different. Pus cells were almost invariably present, but the numbers and kinds of organisms tended to be very large and varied, and in some instances resembled the picture seen on direct smears of normal faecal stools. With the feeding of a high carbohydrate diet, the field changes very markedly with the advent of the fermentative type of intestinal flora. The organisms tend to become more numerous, the long thin type of Gram negative bacillus makes its appearance, and such organisms as *bacillus acidophilus* and *bacillus bifidus*

are seen more often and in greater numbers. These changes are most definite, and in some cases can be watched from day to day.

CONCLUSIONS

1. In a series of twenty-nine cases of infectious diarrhoea at the Hospital for Sick Children during the summer of 1920, sixty-two per cent. were proven by cultural methods alone to be due to *bacillus dysenteriae*.

2. The type prevalent in this series was the Hiss-Russell.

3. It would appear from this comparatively small number of cases, that direct smears made from stools early in the disease—that is before the fifth day—are invaluable in making a tentative diagnosis of dysentery.

I take this opportunity of thanking Dr. Alan Brown and Dr. I. H. Erb for their kindly suggestions and criticisms.

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REPORT OF A CASE OF THROMBOSIS OF THE AORTA AND ILIAC ARTERIES FOLLOWING PNEUMOCOCCAL INFECTION OF THE UMBILICUS

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INFECTION of the umbilicus occasionally occurs in spite of every precaution. The infective agents may be any of the pyogenic organisms, but most commonly belong to the streptococcus group. In 477 autopsies performed at the Hospital for Sick Children since June, 1919, there have been nine cases of umbilical infection. The organisms recovered, by means of blood culture and cultures from the umbilicus and any metastatic areas of inflammation, have been as follows:

- 4 cases *Streptococcus haemolyticus*
- 1 case *Streptococcus mucosus capsulatus*
- 1 case *Pneumococcus*
- 3 cases *Staphylococcus pyogenes aureus*.

As a result of umbilical infection, one may have:—

1. A localized inflammatory process.
2. Erysipelas.
3. Peritonitis.
4. Thrombo-phlebitis of umbilical vessels
5. Septicaemia, including pyaemia.

It is undoubtedly true that septicaemia occurs in practically all cases when the infection spreads beyond the umbilicus.

In the nine cases at the Hospital for Sick Children, there were five cases of peritonitis, two of septicaemia with no localizations, one of multiple abscess formation involving organs and joints and one with thrombosis of the hypogastric and iliac arteries and the abdominal aorta.

In addition to these nine cases of umbilical infection there have been several cases of erysipelas originating on other parts of the body, cases in which the inflammatory pro-

cess reached the region of the umbilicus and was followed by a fatal peritonitis, showing the umbilicus to be an open portal of entry for infection.

The age incidence of umbilical infection in these infants varied from fourteen to twenty-one days, i.e., death occurred in all of the cases during the third week after birth.

Most of the cases showed a reddening and peeling of the skin, several being strongly suggestive of congenital syphilis, especially when the umbilicus showed only slight evidence of any inflammatory reaction. This peeling of the skin is probably a cutaneous manifestation of the septicaemia; in congenital syphilis it is also simply a manifestation of generalized syphilis. As a rule in cases of septicaemia of umbilical origin, the bullae on the palms and soles, which are so characteristic of congenital syphilis, are not found.

It was formerly believed that syphilis was the cause of nearly all inflammatory conditions of the umbilicus, but this view has been proven to be incorrect.

Creadick gives the results of a series of twenty-two hundred consecutive births in which microscopic examinations of the cord were made. In forty-three instances, i.e., 1.9 per cent., there was evidence of inflammation. To demonstrate his point, he has divided his cases into two groups. The first group comprises those cases that occurred before placental bacteraemia was considered. In the second group are placed the later cases in which strict precautions were observed, especially in making examinations after the membranes had ruptured. In the first group the incidence of cord lesions was 2.1 per cent.; in the second it was reduced to

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From the Wards and Laboratories of the Hospital for Sick Children, Toronto.

1.5 per cent. This decrease he ascribes solely to the fact that more care was taken not to introduce septic material into the uterus.

REPORT OF CASE

A full term, male child, normal birth.

Admitted—July 6, at 8.30 p.m.

Died—July 7, at 3.30 a.m.

Age—10 days.

Nursed for 9 days and then refused breast.

Complaint on admission:—

1. Legs turning black—12 hours.

2. Peeling of skin—since birth.

3. Refusing nourishment—1 day.

Early in the morning of July 6, (the day of admission) the nurse noticed dark areas on the baby's legs and by noon the legs were dark in colour. Bowel movement in the admitting-room, in the evening of July 6, was yellowish-green.

Skin over the body was scaling.

Temperature, 98°F.

Post-mortem made seven hours after death:—

The peritoneum was smooth and glistening, but was slightly congested.

Lungs showed many sub-pleural petechial haemorrhages.

Liver was quite fatty and just where the round ligament enters, there was a pyramidal-shaped portion about the size of a small walnut which was darker red in colour. On sectioning this, there was found in the centre a thrombus in a medium sized vein which was traced back through the umbilical vein to the umbilicus.

In the large and small intestines, there were many submucous petechial haemorrhages.

On opening the aorta, it was found to contain a thrombus which extended from a point about one quarter of an inch below the origin of the inferior mesenteric artery down to the bifurcation, into the right iliac artery and then into the right hypogastric artery to the umbilicus. The thrombus extended for a short distance into the left iliac artery.

The lumbar and iliac glands in this region were moderately enlarged and beefy red in colour.

Cultures taken from the peritoneum, umbilicus and heart's blood showed pneumo-

cocci in all tubes except in the material taken from the peritoneum, which was sterile.

Microscopic examination of the lungs showed early broncho-pneumonia with sub-pleural haemorrhages. Microscopic examination of the liver showed congestion and fatty infiltration, being further confirmatory evidence of a bacteriaemia.

On searching for reports of similar cases, I have been able to find only one which was reported by Moschcowitz (2) in the Proceedings of the New York Pathological Society,



Showing thrombus extending from the aorta down into both iliac arteries

but unfortunately there was no copy available. The article was entitled—"Report of a case of Thrombosis of the Aorta and both Iliac Arteries, following Streptococcic Infection of the Umbilical Cord."

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ASTHMA—ITS RELATION TO FOCAL INFECTIONS

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FOR some time past our attention has been drawn to this disease because of the change of the medical conception as to the possibilities of doing more for our patients than has been accomplished in the past. These sufferers go on from year to year, are advised to change climate and move from place to place, some receiving benefit, others merely spending their money with no good results. It would, therefore, appear that in this field much should be done to materially benefit these sufferers.

The present classification of the disease gives us two distinct types, viz.: (a) Bronchial Asthma and (b) Asthmatic Bronchitis.

While it is not always possible to classify a case dogmatically, it is always of distinct assistance to endeavor to assign it to one class or the other with a view of carrying along a line of treatment adjusted to suit the predominance of either the asthmatic or the bronchitic features.

In all of these cases there is a nervous condition which makes the respiratory tract susceptible to some protein whether it be from pollen, from animal dust, from food or from the products of bacterial invasion. Brodie and Dixon (1) have shown that the vagus is the only motor nerve to the bronchial muscles and that in this nerve run two sets of fibres, the constrictor and the dilator. Examination of the sympathetic nervous system in their work gave negative results. They found that stimulation of the constrictor fibres of the vagus could be excited by various irritants of the nerve itself, or of the respiratory mucous membrane and a typical attack of asthma produced—prolonged expiration, over-distended air-cells, dry rales, absence of excessive secretions in the bronchi with no engorgement of the lung. In these cases in which a definite protein is the cause

of the typical attack, it is evident that the protein affects the upper respiratory tract by producing an irritation of the constrictor fibres of the vagus. This in turn produces a stenosis of the smaller bronchi owing to the contraction of their circular muscular fibres. In the cases in which bacteria play an important part producing a more or less typical attack there is usually an associated infection of some part of the respiratory tract. In this class of cases examination will probably reveal trouble in the nasal chambers, accessory sinuses of the nose, infection of the teeth or of the tonsil.

Another class of cases will show that the infection is located in some other part of the body as the appendix, gall-bladder, the intestinal tract and rarely reflexly from some abdominal hernia. We have all noted cases having asthmatic symptoms which were secondary to cardiac and renal disease but these are always more or less atypical in their type.

"While all have become well acquainted with the typical symptoms, it might not be out of place to briefly review these. The irritant produces, though the vagus supplying the circular bronchial muscles, a narrowed lumen of the bronchi extending well down to the air-cells. The weaker expiratory muscles are unable to return the full amount. This is repeated a few times, when the air-cells naturally become over-distended. The act of expiration becomes prolonged and is difficult. Cyanosis is marked, the patient's face bears an anxious expression and he becomes apprehensive as to the outcome of the attack. A dry cough now usually sets in followed by the expectoration of some mucous secretions and the attack is over. Fluoroscopy if done during the attack will show a fixed diaphragm, usually depressed or in a position midway between the limits

of its excursion for expiration and inspiration. The attack may last for only a short time or may be carried on for days. Beyond fatigue following such exertion the patient is in a normal condition until another attack is precipitated by exposure to the same protein as in the first case.

Walker (2) in classifying the cause of bronchial asthma by means of the cutaneous or skin tests, shows that there is the true or sensitive type which may be distinctly separated from the atypical or non-sensitive type. In the latter, what we should call asthmatic bronchitis, bacteria play a very important part. Only 48 per cent. of his cases were sensitive to the proteins of pollen, animals and food. The other 52 per cent. were non-sensitive, while 10 per cent. of the sensitive cases could be traced to bacterial proteins. Of these the most common bacteria were staphylococcus pyogenes aureus, streptococcus haemolysans, staphylococcus pyogenes albus and streptococcus viridans. No doubt many other bacteria produce proteins that will give like results. In many cases the patient is no doubt subject to different proteins as pollen, feathers, hair and food. The prolongation of these symptoms, however, is kept up by bacteria adding their quota to the sum total of irritants.

The object of this paper is to more particularly draw attention to some of the benefits to be derived in a certain class of case by determining the location of the bacteria and removing it. The location of the site of infection is not always easy, but the results, when once they are removed, usually produces decided improvement.

In making such an examination it becomes necessary to investigate each organ of the body carefully and systematically. The nose with its accessory sinuses should receive particular and careful attention both for infections and deformities. The x-ray and transilluminator will prove of valuable assistance. The tonsils if infected should be removed. The teeth, where at all suspicious, should be x-rayed for abscess or unerupted molars. In the examination of the chest one should endeavor to locate or exclude early tuberculosis of the lung, syphilis of the lung, chronic bronchitis or bronchorrhoea. Where physical examination suggests thickening of the

lung tissue anywhere this should be confirmed by the x-ray. The examination of the heart is made with a view to discover aortic changes and in doing this note should be made of its relative position, of its size and particularly the condition of the muscle of the right heart. The continued strain on the right heart in asthmatic subjects will show itself in weakened and thin muscles and improvement sometimes takes place by using cardiac stimulants. A search in other parts of the body for reflex irritation or foci of chronic absorption leads us to examine appendix, gall bladder, fallopian tubes, ovaries, hernia, etc. The Wassermann test is of great value. A complete urinalysis and a differential sputum analysis should be made in all cases. Some physicians have been impressed with the value of a bacteriological examination of the stools, but of this we have no knowledge or experience. The protein sensitization tests for the various foods, pollens, animal epidermal proteins are also of great value, but do not come under the scope of this paper.

Once having located the foci of infection the treatment is definitely indicated and in this connection we would like to present a few illustrative cases:—

Case No. 1.—This was a woman of about 45 years of age, who had tried various climates to relieve herself of asthmatic attacks which had become so severe that she was unable to work for two years. She had lost about 20 lbs. in weight with attacks coming on every night and occasionally during the day. Complete physical and laboratory examination negative but the x-ray showed numerous abscessed teeth. These were removed under a local anaesthetic following which she had severe haemorrhages from the gums and was confined to bed for a week. During this time her attacks of asthma disappeared and she remained clear for several months, when an attack of influenza brought on a return of some of her old symptoms. From these she improved and was much better when she dropped out of our care.

Case No. 2.—Locomotive engineer, aged 40. Had had typhoid ten years before followed by an abscessed tooth. For several winters he had had attacks of bronchitis which became more continuous. About

seven years ago definite symptoms set in which grew steadily worse till he was forced to move West in search of health. Complete examination was negative in all respects except for some emphysema and a few abscessed teeth. These were promptly extracted under a local anaesthetic and he noted improvement in a few days. Since then he has had no return of his asthma and bronchitis, but is subject to hay fever, and is sensitive to the protein of feathers but not sufficient to prevent him from working. An attack of hay fever at the seasons when the pollens are most prevalent brings back an attack of bronchitis, but this lacks the definite asthmatic symptoms from which he had suffered before. It is evident in his case that the bacterial invasion through his tooth set up a definite bronchitis upon which was implanted the asthmatic symptoms and that he has a separate and distinct protein sensitization for certain pollens and for feathers, but we are quite satisfied that the chronic absorption from the abscessed teeth added much to making him the subject of bronchitis.

Case No. 3.—Farmer aged 45. Had had asthma for 11 years to such a degree finally that he had to quit work on his farm and to seek relief by changing climate. Complete examination of chest, nose and throat, urine, etc., was negative, but the x-ray showed a number of abscessed teeth with pyorrhoea. These were removed under a general anaesthetic and in three weeks he had no asthmatic symptoms. For six months he made a steady gain in weight until he was back to normal and at the end of a year was working in a saw-mill every day and feeling perfectly well.

Case No. 4.—Farmer aged 38 who left the Pacific Coast seeking relief from his asthma which had extended over four years. His history shows that he was subject to colds and bronchitis during the winter and was usually better, although not clear of his trouble during the summer. Complete examination showed everything negative except a trace of albumin in the urine with a few pus-cells, and four abscessed teeth—lower incisors—which had been injured when he was a young man. The removal of these teeth under a local anaesthetic was fol-

lowed by a very acute attack in two days which gradually disappeared and has not since returned. An interesting feature in his case is that the albumin and pus in his urine has likewise disappeared and he seems to be perfectly well.

Case No. 5.—Merchant aged 40, complained of asthmatic attack coming on in the early morning with a sense of constriction about the chest wall and a loss of weight extending over some months. His examination was negative except for abscessed teeth which were promptly removed under a local anaesthetic. His asthmatic symptoms disappeared and he readily gained his loss in weight, but he is still sensitive to certain pollens and has seasonal attacks of hay fever.

The results of such cases as these have convinced us of the value of careful examination of the teeth to correct or exclude alveolar abscesses or pyorrhoea.

Case No. 6.—Laborer aged 35. Had had asthma for ten years and had visited various parts of the country seeking relief. He came here from Calgary and developed a most violent attack that required a half a grain of morphia hypodermically to control. He gave an indefinite history of having some venereal infection fifteen years before. Complete examination was negative except for slight dullness over the roots of both lungs. Wassermann was four plus positive and the x-ray showed peribronchial masses and hilus thickening of both lungs. He was placed on intensive treatment of Neo-diarsenol with Grey oil hypodermically and large doses of potassium iodide by mouth. In a few weeks his asthmatic symptoms disappeared and after following up the full course of ten doses in the hospital was discharged and the last heard of him he was working on a ranch with no return of his symptoms.

Case No. 7.—Miner aged 50. He came from the United States seeking relief from asthma. He had been unable to work for three years, he had grown emaciated, was very weak and was suffering from difficult asthmatic breathing at all times even during the day. His attacks of asthma at night prevented him from sleeping. After having a positive Wassermann reaction he gave a history of a luetic infection 18 years before. The complete examination showed areas of dullness over the roots of both lungs and the

x-ray picture illustrates large oval bilateral opacities in the region of the hilus. He was started on our routine luetic treatment and in a few days noted a decided improvement and after following up the treatment for a few weeks he had lost all his asthmatic symptoms, had no impairment of breathing and has returned to work.

In these cases it is a little difficult to say where the source of irritation arises, but we feel it is due to the gummatous invasion of the lung involving some of the filaments of the vagus nerve which reflexly causes irritation of the constrictor fibres of that nerve. These cases show the necessity of eliminating syphilitic infection as a possible cause of asthmatic bronchitis.

Case No. 8.—Housewife aged 45. This patient came from the Prairies seeking a change of climate. She was very much emaciated and whenever she contracted a "cold" had repeated attacks of asthma every few hours. When she was clear of her "cold" usually had an attack of asthma during the night. Her trouble had evidently developed some four years before, following an attack of quinsy. For two years she was subject to bronchitis following this attack when the asthmatic symptoms were implanted upon the bronchitic. The combined symptoms had made it so that she was unable to do any work. Examination of the nose and throat revealed a badly infected tonsil on the right side with marked irritation of the upper respiratory tract. Examination of the chest showed a diffuse bronchitis, while the quantity and character of the sputum suggested bronchorrhoea. The tonsil was removed under local anaesthetic with the results that within a few days her asthmatic symptoms began to disappear and for some time she remained clear of her asthmatic attacks until she contracted the epidemic influenza, when she had a return of her asthma in a milder form. She made a slow recovery from this until she lost her asthma entirely, but has a considerable amount of bronchitis. An interesting point in her case is that a recent report upon her sputum from the Vancouver General Hospital shows a gram negative diplococcus with abundance of bacilli which the bacteriologist states is probably the colon bacillus. An autogenic vac-

cine is being used in her case with very satisfactory results.

The interesting feature of this case is that it demonstrates that tonsillar infections give rise to bronchitis and that upon the consequent bronchitis there were implanted the nervous symptoms giving rise to asthma. It also shows that tonsillectomy is justifiable in all cases of asthma where it can be found through the history and the condition observable that this organ is an offending member.

Case No. 9.—The patient aged 37, office man had had fibroid phthisis for 19 years. Had had sanatorium treatment and had the usual relapses with haemorrhages. His tubercular disease had invaded almost every part of his lung with the consequent compensatory emphysema. He had shortness of breath on exertion, some morning cough, a small amount of positive sputum while his general condition was fair. He had an attack of cholecystitis and while under treatment developed a secondary gastritis. This cleared up under rest and diet with the usual treatment and he seemed to be about normal. For several years, however, following an infection of his nasal chambers and frontal sinus he has had typical attacks of asthma. With this he always complained of a sense of congestion of the nose, a feeling of oppression and discomfort over the bridge of the nose and some frontal headache. With this he generally felt dull mentally. His case was suggestive of ethmoidal empyema and this opinion was confirmed by the x-ray to such a degree that it was decided to drain the anterior ethmoidal cells surgically. Owing to his general condition being poor this was done in two stages, first the removal of the posterior end of the superior turbinate bone which gave decided relief and freer drainage for large quantities of mucopurulent secretions. Upon opening and draining the ethmoidal cells he lost his asthmatic attacks and with that the hyper-sensitiveness of his nasal mucous membranes.

For generations both physicians and patients have demonstrated the benefit to be derived by a change to a higher and drier climate and in this connection we might suggest that the improvement noted in asthmatics may be due in some degree to the improved

drainage of the accessory sinuses due to the lessened congested condition of the mucous membrane of the nose and these sinuses.

Case No. 10.—Mechanic aged 40. Has had asthma for four or five years steadily. The chest examination showed signs of early tubercular thickening at hilus of right lung and he is at present under treatment with tuberculin. The results so far are very satisfactory as he reports no attacks, but it is too soon to be sure of our results.

Case No. 11.—This case is one of a young man of 17 who complained of shortness of breath, worse at night and with a sense of constriction about the chest. The removal of an abscessed tooth promptly relieved all symptoms.

Case No. 12.—This man aged 47 had bronchitis for past four years, and during this time had occasional attacks of asthma. These attacks had become more severe and more frequent for past four months. Complete physical and laboratory examination negative except for infection of right lower second molar. Extraction cleared up his symptoms in three weeks.

Case No. 13.—This man aged 36 had first attack of asthma in June, 1919, to recur again in Dec., 1919, when he had his tonsils removed. He was then well until May, 1920,

when he had a return of his attacks. Complete examination both physical and laboratory negative except one abscessed molar. He improved promptly and a short course of potassium iodide cleared up his symptoms.

In conclusion I would like to draw attention to the fact that many of the asthmatic bronchitic cases of the middle aged can be benefited by the location and removal of their focus of infection. This may be done by surgical means or sometimes by vaccines and in the event of these failing, it is well to advise climatic and hygienic changes.

It is interesting to note that there is no higher percentage of these cases who are tubercular than is found in other chronic diseases. We have also found that in a large series of pulmonary tubercular cases there is a low percentage of asthmatics found.

And lastly, that to successfully care for the asthmatic bronchitic case it is usually found that the bronchitis precedes the asthma, and that in its treatment due consideration must be given to the bronchitic features.

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TUMOURS OF THE URINARY BLADDER, DIAGNOSIS AND TREATMENT

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THE closest scrutiny of the diseases of the body will not reveal one more insidious in its onset and course, or more malignant in its ultimate conclusion than bladder tumour, and this fact should inspire us with a very great desire to make an early diagnosis.

When we consider the symptoms of bladder tumour we are readily conscious of the reason for the obscurity which has veiled these conditions in the past, as we realize, that in the early days of the growth there is often no symptom of any sort, let alone one that is pathognomonic. There is unanimity of opinion among the various writers that haematuria is usually the first symptom. But blood in the urine is also frequently the first symptom noted in renal calculus, renal tuberculosis, renal malignant disease and the essential haematurias; and further, who can say how long the new growth has existed before this symptom made its presence known.

The various other symptoms such as pain, cystitis, obstruction, frequency, urgency, ulceration, necrosis, decomposition of urine, systemic sepsis, etc., are well known to all of us. As we pause, however, to consider them we are soon forced to the conclusion, that any symptom or group of symptoms that may be present with a bladder tumour may also be associated equally well with so many other conditions that an accurate diagnosis by means of the subjective symptoms and clinical findings, at a time early enough to be of much service to the patient, is an absolute impossibility, in by far the great majority of cases. The only clinical finding that may be said to be pathognomonic of this disease is the appearance of shreds of tumour tissue in the voided urine, but unfortunately, while this is not an infrequent occurrence, it is usually rather late in the history of the case.

There is not time to enter into the pros and cons of the matter of symptoms, because, when the last word has been said this fact remains, that it is now quite generally admitted that there is no accurate clinical means of determining the source of the blood in a haematuria, the source of the pus in a pyuria, or the underlying cause of many obscure urinary conditions except by the aid of the cystoscope. This being the case, then, neither patient nor surgeon may afford to view with complacency an attack of haematuria, or be satisfied with simply having by treatment controlled the symptoms until every means of ascertaining the underlying cause has been exhausted.

My own opinion is, that a haematuria should be regarded as a very grave symptom; that it ranks in seriousness with acute pain and rigidity in the right lower abdomen; that it positively demands immediate, accurate investigation of its origin and cause by means of the cystoscope, while the patient is still bleeding, because diagnosis, which at that time is usually a comparatively simple matter, is often an impossibility when the attack has passed off.

When one understands that with good technique this instrument reveals abnormalities of the bladder just as plainly as we see pictures on the wall, we are more ready to admit that if such a drastic procedure as exploratory laparotomy is ever justifiable for any cause, then, the least suspicion or suggestion of a bladder tumour warrants and demands a cystoscopic investigation of this viscus, because, by this means we not only diagnose the presence of a tumour, but are able to speak with considerable assurance as to its pathology.

The non-malignant tumour, which is most frequently a papilloma, usually occurs in a bladder otherwise normal, and in so far and

in such degree as its environment varies from the normal, just so much is the new growth likely to be malignant in character or undergoing the process of change from the simple to the reverse.

Most of us, however, are not deeply interested in the cystoscopic appearance of bladder tumours, but very briefly it is this, a clean cut villous growth on an otherwise apparently normal bladder wall is usually benign, but if the growth is multiple; if it presents an unhealthy looking, angry red appearance; spreads down onto the adjoining; if in addition, there is a thickened, raised, puffy, nodular, oedematous condition of the bladder wall about the base of the tumour; if there is ulceration, necrosis, or phosphatic encrustation of the surface of the growth itself; in proportion as these different features appear, we can surely diagnose the change from the benign to the malignant.

The diagnosis of the first and the last presents little difficulty, but there are between these two extreme types, many cases which we may term borderline and in regard to which it is not always easy to be positive. In these cases it is possible and sometimes advisable to snip off a piece of the tumour through the operating cystoscope or with the cystoscopic rongeur, for examination by the pathologist. But if this is done it must be carefully borne in mind that the malignant change may begin in any part of the growth; it may begin in the base or in the upper parts of the tumour; it is not a gradual change that affects equally the whole neoplasm at one and the same time, but may for a considerable period involve only a very small segment, perhaps only one villous projection or nodule, and so the section we have been at considerable pains to obtain offers no criterion as to the character of the rest of the growth.

The wisdom of this procedure is therefore doubtful, since there is always the danger of haemorrhage and implantation due to trauma to the new growth and bladder wall. A negative report means nothing, and a positive report will make no difference to the treatment.

In this connection it is interesting to note that while patient and surgeon do not view

these conditions from exactly the same angle, still their ideas are parafocal to this extent that the attention of both is called to them only in so much as they menace comfort, health and life, and both are chiefly interested in their complete eradication, where such is a surgical possibility, and failing this in administering such palliative measure as may be deemed advisable. It appears to make no material difference whether the tumour be carcinoma, sarcoma, or benign; the treatment is practically identical in each case.

While these growths may be located at any point in the bladder, the most usual location is about the base. The neighborhood of the ureteric orifices is a very favorable spot, occasionally the trigone, and sometimes the internal meatus. This is both fortunate and unfortunate, fortunate in that it is the most accessible part of the bladder in so far as diagnosis and treatment by means of the cystoscope are concerned, and unfortunate, very unfortunate indeed, in those cases in which for some reason diagnosis and treatment have been too long delayed and ureter, vesicle, or prostate, or all three are involved in a malignancy. These cases are practically all inoperable, and whether we operate or not the prospect is misery, and the future hopeless in most instances.

Treatment—The treatment of malignant disease of the bladder is not more satisfactory than the treatment of similar conditions elsewhere and the deciding factor as to what shall be done in a given case is usually a question of the man and the moment. But the pity of it is that a large percentage of the hopeless cases that present themselves to the surgeon were benign at the beginning, and had attention been paid to their earlier manifestations their treatment would have been a very simple matter.

Radium has been a disappointment in these cases. Those with the greatest experience in its use all voice the opinion that it does not make the least impression on a growth positively malignant. It has, however, been of decided benefit in some cases of an early malignant change in papillomatous growths, some tumours which had not responded to fulguration yielding quite readily to radium or to a combination of radium and fulguration. It has, therefore, an undoubted

but limited field of usefulness in this class of tumour. It must be remembered that the effectiveness of radium varies with its distance from the growth to be exposed and that there are difficulties to be encountered in maintaining a direct contact between the radium and the surface of the new growth in the bladder, per urethram. Still these could be and have been overcome when a sufficient amount in the proper form was procurable to make the treatment worth while.

Until very recent years the difficulties of diagnosis have been very great and the attempted surgery on growths sufficiently far advanced to be diagnosed by the subjective symptoms and clinical signs was not very encouraging. Even in later years surgeons of note have been of the opinion, that tumours of the bladder were best left alone, partly on account of the difficulties encountered at operation and partly on account of the great danger of wide-spread recurrence. Then the discovery was made that villous growths of the bladder lent themselves very readily to transplantation and that little particles of epithelium eroded from either benign or malignant tumors during the course of operation were likely to seed themselves down and form new growths on any part of the bladder mucosa that might be damaged during manipulations. As might be supposed, this made a very great difference to the prognosis in the surgical treatment of this disease, and consequently when steps were taken to eliminate this danger the number of recurrences was markedly reduced. But even with this extra care, simple excision of the growth was not found to be sufficient, and Dr. Geraghty of Baltimore reports that recurrences were three times as frequent after simple excision, as when there was also a resection of the underlying portion of the bladder wall.

Nitze and Casper developed a method of radical removal through the cystoscope by means of the snare and cautery. They secured results far superior to those obtained by the supra-pubic method. But either through lack of skill, experience, or the proper instruments, others were not able to duplicate their results. There was consequently no evidence of very great enthusiasm in regard to this method, and so it happens that

until very recently the method of choice in attacking bladder tumours has been supra-pubic cystotomy.

It is now about ten years since Dr. Edwin Beer discovered and developed a method whereby it became possible surely and safely to destroy new growths on the bladder wall by the application of the high frequency current through the cystoscope. His discovery may easily rank as one of the most noted in a decade in which noted advances in the field of medicine and surgery were the order of the day. Howard A. Kelly of Baltimore makes this comment, "That Dr. Beer's work has wrought a most welcome transformation in what was previously often a perplexing situation. He has reduced the complex to the category of the simple, always a notable surgical achievement."

Fulguration is the term, which by common consent has been applied to this method of treatment. It has long since passed the experimental stage and, in experienced hands and in selected cases, yields results far superior to that which it is possible to obtain with the knife.

It does away with all the danger, pain, discomfort and inconvenience, contingent upon an open operation on the bladder and makes the removal of a papilloma only a matter of a few sittings in the office.

Statistics show that these conditions are three times as frequent in men as in women, and where the open method requires a more or less serious operation, and from one to four weeks lost time, fulguration requires only an occasional hour during which a general anaesthetic is not necessary, and in most cases the patient suffers very little more inconvenience than is encountered in obtaining a catheterized specimen of urine from the bladder.

Providence has so ordered that by far the greater number of these tumours occupy that portion of the bladder most easily reached through the cystoscope, thus rendering their treatment a comparatively simple procedure.

It has been quite definitely shown that recurrences are more frequent after the open method than after fulguration, sometimes being spread broadcast over the entire mucosa and often occupying positions not easy of access for treatment, should subsequent

fulguration be advised. If after fulguration, recurrence does take place, it does not mean another siege in hospital but merely another few minutes treatment on one or two days as the case may require.

In four hundred cases tabulated by Geraghty, Buerger, Von Frisch and Albarran, fifty per cent were classified as benign papillomata, and of the remaining fifty per cent a considerable number were papillary carcinomata, or in other words papillomata, which had undergone malignant change, and these are the type of tumours that respond well to the high frequency spark.

In the face of these facts then I believe there is no excuse for subjecting the unfortunate possessor of a bladder tumour to the dangers and discomforts of an open operation, until fulguration has failed or the cystoscope shows it to be unsuitable for such treatment.

Fulguration is applicable to about fifty per cent of the general run of cases as they are met with from day to day. If earlier

diagnosis could be obtained there is good reason to believe that it would be applicable to at least sixty-five per cent. of the total number of bladder growths. In positively cancerous conditions, fulguration has no effect, and the operator is only wasting his time and the patient's chance if he persists in this form of treatment after two or three applications have produced no good results. At present, under existing conditions, if we would do that which is best for our patients, fifty per cent of bladder tumours will be removed trans urethram, and the other fifty per cent, operable or otherwise should be dealt with by the open method.

You have only to witness a large troublesome papilloma rapidly dwindle under the effects of fulguration to be absolutely convinced as to the desirability and efficiency of the method. Its application is so simple and its results so striking that the conversion of the unbeliever is only a matter of a single demonstration.

PREVENTION OF MENTAL BREAKDOWN

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IN Manitoba at the present time there are over twelve hundred patients in the three mental hospitals, demanding from the province annually for maintenance alone an expenditure of about half a million dollars. There is also the loss due to the withdrawal of a large number of producers. But the economic burden is not the only side of the question. There is the human side, the mental distress of those unfortunates whose reason has proved unequal to the strain of modern life as well as the suffering of their relatives. Outside these Institutions there is a great host of men and women, who for one reason or another, are unable to adjust themselves properly and who therefore are in

reality more or less of a burden on the community. These are the borderline cases who have not and may never reach the stage where it is necessary to deprive them of their liberty. Yet they are mentally ill as truly as are many of the institutional cases. The prevention, therefore, of these conditions of mental breakdown or maladjustment is a problem of great extent and extreme importance.

Absolute prevention is dependent upon full knowledge and absolute control of the causes of mental breakdown. This is beyond our power, but much is known of the causes and over these we have or may have some control and much in the way of prevention

may be accomplished by a judicious exercise of this knowledge and power.

Mental breakdowns are due to physical disease, often involving the nervous system directly or indirectly; to bad heredity and to faulty development together with the mental stresses and strains of life. These latter are bound to occur in any civilized community, are likely to vary in proportion to the responsibility thrust upon the individual and are due to the complexity of life. As it is not desirable that individual responsibilities be lessened generally, but rather that the resistance of the individual in general be increased, the reduction of these mental stresses will not be considered as a means of prevention except in the case of those unfortunate individuals known to have a mental equipment of low resistance.

Various acute and chronic infections, organic diseases, head injuries, senile and arteriosclerotic changes, are known to give rise to or strongly predispose to mental disease. Present investigations would indicate that endocrine disturbances play a larger part in mental disease than was formerly thought. On the other hand the mental state profoundly influences the endocrine balance and hence the cause-effect relations of this whole question are still obscure. We have little or no control over some of these medical conditions, such as senility, and hence little can be done with such causes. But the prevention of the causal condition in general results in the prevention of the mental sequela and is therefore to be dealt with as a general medical problem.

Two causes, however, on account of their social importance and as both are preventable, require special consideration. They are alcohol and syphilis. William A. White states that they together "are responsible for fully 20 per cent. of the certifiable psychoses in males at least." (1) Again referring to alcohol, he says: "Recent statistics would indicate that 12 per cent. of the insane confined in public institutions in the United States are there because of its influence, direct or indirect." (2) In some hospitals receiving patients from large cities the proportion of syphilitic psychoses among first admissions is as high as 13 per cent. (3) In Canada generally, because of our smaller cities and large rural population, the per-

centage falls much below these figures. During the last nine years in the Brandon Hospital for Mental Diseases 8.9 per cent. of the deaths were due to general paralysis of the insane, but so far as can be ascertained from records not over 1.7 per cent. of the admissions were cases of this disease.

The methods of combatting venereal disease and alcoholism have, during the past three or four years, received widespread attention in both the medical and public press and need only be mentioned. The prevention of syphilis depends upon the teaching of young men and young women the advantage and necessity of living clean, continent lives, sublimating adequately sexual energies, and constantly remembering the duty they owe themselves, their fellowmen and posterity. Where these powerful emotions cannot be turned into useful channels, thorough preventive and prophylactic precautions should be taken. Finally early, thorough and prolonged treatment is necessary for those who have been infected. Farquhar Buzzard says that treatment should continue intermittently for the rest of the patient's life.

The experience of the war years may be regarded as pointing the way to the prevention of the psychoses due to alcohol. During the year 1916 and since, there has been a marked falling off in the admissions to the Brandon Hospital for mental diseases. This has been attributed in part to the diminution in the use of alcohol as a result of war measures. Only two cases of alcoholic psychoses were admitted to this hospital during 1920. The contrast between this and the corresponding admissions in a country where the same restrictions regarding alcohol do not obtain is very striking.

Kirby (4) has shown that in the New York State Hospitals there has been a falling off of cases of alcoholic psychoses among the first admissions from 10.7 per cent. in 1909 to 1.8 per cent. in 1920. He indicates that this is due to the great trend of public opinion against the use of alcohol that has been growing during the last fifteen years, and which has culminated in prohibition measures.

Certainly, so far as the problems of mental disease are concerned, prohibition deserves an extended trial.

Faulty or tainted heredity has been var-

iously regarded as bearing an important causal relation to mental disease in from 60 per cent. to 70 per cent. of cases admitted to mental hospitals. In these conclusions true hereditary tendencies and developmental factors have doubtless not been fully differentiated. Three groups of factors are likely to be confused: Tainted heredity in the true sense, that is, abnormal tendencies due to defective germ plasm; germ plasm damage occurring at the time of, just previous to, or after conception, through alcoholism or the toxic effects of chronic debilitating disease; and developmental factors, or as Adolph Meyers expresses it: "Early growth and nutrition" on the physical side, and "training and habit formation" on the mental side.

Prevention in relation to heredity is largely a question of marriage. Marriage is a much more serious question for future generations than those contemplating it appear to recognize. The personal or selfish aspect is unduly emphasized. The *raison d'être* of marriage is the propagation of the species, and young men and women should have their ideals so developed that only mates healthy in mind and body would normally be chosen. While the ideal is, of course, that both individuals should be healthy mentally and physically, that is seldom attainable, and in reality the limits of marriageability are not so narrow as many eugenists would have us believe. It has been found that the prospect of healthy progeny from the mating of tainted with untainted or even with slightly tainted stock is good, and the number of those mentally unstable is much less than the number of those mentally sound and the value of the latter to the world much outweighs the loss on account of the care and protection required by the former.

Individual tendencies depend upon hereditary, conceptional and developmental influences and where there are slightly unfavorable hereditary influences they may be neutralized to some extent by taking special precautions to provide good conceptional and developmental influences. Where these unfavorable conditions obtain, therefore, the facts should be frankly faced by those contemplating matrimony, so that special attention may be directed to the other factors.

It is difficult to formulate sounder advice than that outlined by Adolph Meyers.

(5) The reader is referred to Meyers' article for a full discussion.) He says that if two individuals "can feel and give to their own sense and conscience reasonable assurance of giving a family of four children a wholesome, healthy environment and education, then even tainted persons might be allowed to marry, especially into untainted stock." He further adds: "If unfavorable heredity should crop out, it would be highly probable that the healthy and capable brothers and sisters would be able to assure the protection and care of the problematic abnormal individual."

From a practical standpoint one may say that marriage should be prohibited:

1. Where either the man or the woman has had a mental breakdown.
2. Where one or both have marked psychopathic tendencies.
3. In the case of all mental defectives, except the higher grades of the moron class and even then when psychopathic tendencies are present.

One is sometimes asked if a marriage without children is permissible, that is, where conception is prevented by continence or contraceptive measures. In all cases where one only of the contracting parties is abnormal such a marriage should be forbidden. It is unjust to the normal individual. Theoretically, in certain circumstances it might be permitted between two psychopathic individuals or where the stock was tainted on both sides, but then only with full knowledge of the responsibilities involved. Where one of a couple already married has had a breakdown no subsequent conceptions should be allowed to take place.

A compulsory medical examination of both parties before marriage has been advocated, and, I believe, has actually been provided for by statute in certain States, but is of doubtful value, as unscrupulous examiners could always be found to sign the necessary documents. A simple physical examination is of no great value, in itself, except to rule out active venereal disease. A thorough evaluation by a medical expert, voluntarily obtained by the contracting parties and involving a consideration of ancestry, mental, attributes and physical condition would, however, be of the greatest value. It would enable the two individuals to assume their

new responsibilities with important knowledge of possible facts likely to affect adversely the resulting progeny and thus to be prepared to neutralize, in so far as possible, undesirable tendencies.

Sterilization of those who have had a mental breakdown and of mental defectives has been frequently mooted, but is of doubtful value and in many cases would not be advisable. It might with wisdom be recommended in certain individuals, mainly of the feeble-minded groups, viz., 1. All imbeciles and some low grade morons. 2. All morons with antisocial or marked sexual tendencies. 3. A few psychopathic individuals especially those with hypersexual tendencies.

So important are developmental influences, that is, early growth and nutrition and training and habit formation, that William A. White has referred to childhood as "The Golden Period of Mental Hygiene." Even with a tainted hereditary much can be done during this impressionable period to neutralize unfavorable tendencies and to create healthy habits of thought. Like Demosthenes, the individual may not only surmount his obstacles but actually achieve greater success because of them.

The moulding of the child's environment should begin before birth, and even before conception, in the teaching of mothercraft and fathercraft to young women and young men so that they may be prepared to intelligently assume the responsibilities of parenthood. The importance of good health on the part of both parents at the time of conception should be emphasized.

The importance of attending to the child's physical health is generally appreciated, but not so the importance of ensuring good mental habits.

Mentally, each individual may be said to have inherited three fundamental instincts or emotions which are the mainsprings of life, the forces which carry the individual through the world. They are: The self-preservation instinct, the race-preservation instinct, and the herd instinct. Manifestations of the first are hunger and fear. It compels the individual to provide for his nutrition and to protect himself from his environment. It is pre-eminently selfish and direct in its operation. The second, in its narrow sense, is manifested by the desire for

sexual gratification; in its wider sense it gives rise to the great emotions of maternal and paternal love, filial love and friendship. It is essentially indirect and altruistic. The third may be regarded as a derivative of the other two emotions and enables us to live in communities as social beings. These emotions demand satisfaction and their energies ordinarily find outlet in a healthy way directly or indirectly by sublimation. They will otherwise be repressed and hence find outlet in unhealthy ways. The great purpose of training and habit formation, that is, of education in a broad sense, is to enable the individual to control these emotions wisely and to use their vast energies in a healthy way, to enable him to boldly face and efficiently control his environment and not to allow his energies to be dissipated in useless fantasy.

The great laboratory for this developmental work lies in the home. Nowhere else does one find work done from truly altruistic motives. There it is performed in response to the dictates of the race-preservation instinct. In general, work is elsewhere done by virtue of the self-preservation instinct which is essentially selfish. Therefore, any action of the State that transfers fundamental responsibilities from the home to the state or reduces the influence of the home is pernicious. Therein lies the fallacy of the theories of such socialists as Ellen Keyes who preach state reared children. No matter how lowly or how bad the home there is almost invariably a spark of mother love to exert its influence on the young from birth onward. Anything the State can do to shield that spark and to fan it into a flame is of value. The preservation of the home is of fundamental importance to the race.

Our school system in the past has emphasized intellectual development and has shown a tendency to rob the home of some of its importance. That attitude is changing to some extent, and now the school is trying to supplement and not supplant the home. By the development of playground facilities and of manual training and domestic science it is emphasizing the emotional and volitional as well as the intellectual. Children can learn to control themselves more by surmounting physical difficulties than by achieving intellectual successes. The young

man or woman who has learned to play a game cleanly, honestly, and to the best of his ability is likely to play the game of life in the same way.

The training of a child should begin the day of its birth. The unborn child may be said to be omnipotent. Everything is done for it and all its desires are satisfied. The infant is less so, but still its exertions are confined to breathing, suckling, defaecation and urination, which are semi-automatic acts. Later, it learns to cry when it is hungry and then to reach out or creep toward and grasp whatever it wants. It is learning to overcome its environment. Year after year the individual's desires become more numerous and more complex and the satisfaction of these desires more difficult to obtain and more removed in point of time until we find the adult striving for the satisfaction of his own needs and desires and for those of his family, a satisfaction that may not be attainable for years, or that may even be problematical.

At each stage of development a more efficient mode of reaction is normally adopted. But abnormally less efficient modes may become fixed and carried on. This produces a maladjustment to environment and may be one of the factors causing a mental breakdown in adult years. For example, we find a spoiled child flying into a temper and crying for things he should be striving for and we find the adult wasting his energies in useless fantasy and sensitive seclusion instead of actively and fearlessly forcing his environment to yield him the reward he desires.

It is the duty of parents and others to foster in children correct mental habits so that these developmental milestones may be successfully passed. The more youthful methods of adjustment must be discarded at the proper time for more efficient and mature. In this way the young man and the young woman may be prepared for the struggle of life with the proper mental equipment for adequate adjustment.

The developmental period is not without its special problems, with which all having the responsibility of children should be familiar.

There is first the abnormal child, the neurotic or psychopathic child. He is often said to be "highly strung." He may be timid,

sensitive and seclusive. He may be excitable, violent tempered, or subject to terrifying dreams. Such a child requires exceptional care and deep sympathy. It is essential that the parents face frankly the abnormal tendencies. We so often try to conceal even from ourselves these tendencies in our own children. This attitude is an unfortunate attitude and only robs the child of much needed assistance. In such a case the objective interests must be developed and the physical rather than the intellectual activities emphasized. For him outdoor life, outdoor games and outdoor work are essential. These children are often extremely sensitive, especially to ridicule and censure, and tend to become morbidly seclusive. Intelligent sympathy and encouragement are necessary to counteract this dangerous tendency. With care not only can the danger of a subsequent mental breakdown be avoided, but frequently this type of child may be developed into the highest type of citizen.

Certain developmental periods require special care. They are the periods of infancy, of puberty and adolescence. The importance of laying good foundations in infancy has already been emphasized.

Puberty and early adolescence is a period of many dangerous reefs. During it various conflicts arise between the established ideals and the newly awakened sexual emotions. Both boys and girls require special guidance. The interests should be largely objective. Hard study should be avoided, especially in girls who seem apt to become unduly ambitious at this time. Excessive fantasy-habits during this period are easily formed. Day dreaming is especially characteristic of this period and is, within limits, normal, but should be outgrown to a great extent as adolescence progresses. If the individual is seclusive, and healthy external interests have not been developed, this normal reaction of youth becomes fixed as a bad habit in the adult and prevents effective adjustment.

The third great problem is the teaching of the knowledge and meaning of sex. Sexual activities and interests are the manifestations of one of the fundamental emotions, an emotion that is bound to have some outlet direct or indirect, normal or abnormal. About it occur many conflicts and, without care, many dangerous repressions. All are agreed

that young men and women should possess some knowledge of their instinctive natures, and that this knowledge should come through clean channels. The question is, when shall the child be taught and by whom?

We are told by some educators that it may be taught in school and if taught as any other branch of knowledge no undue curiosity will be aroused. They tell us that the morbid curiosity is due to our conspiracy of silence. This, I believe to be incorrect. Sexual curiosity is no ordinary curiosity. It is an interest surcharged with emotion dependent on the activities of an instinct no less powerful than the self-preservation instinct, and because less direct in its action more powerful in its interest. No matter when or where sex knowledge is taught one runs the risk of awakening untimely emotions and fancies, or of overstimulating those awakened. As the child's interest normally and spontaneously awakens, so should his desire for knowledge be slowly and tactfully satisfied. In other words, when he asks questions these may be simply and frankly answered in so far as his understanding will permit.

Under these conditions none but the parents are in a position to impart information regarding sex, and it is from the parents that it should always come. In cases where they feel themselves incompetent, they might presumably refer the child to some trusted and respected friend, such as, physician, teacher or other person. In the school may be taught the facts of biology with reference to plants and lower animals, but not all the facts of human physiology. Moreover, the child must have received the rudiments of his knowledge before he is old enough to study biology in school or his playmates will have forestalled the teacher.

Once well past the age of puberty young men and young women may be taught the facts of sex and the principles of fathercraft and mothercraft with profit by special teachers in our high schools, especially if the elementary facts have been properly learned in childhood.

Developmentally then the prevention of a mental breakdown depends on the development of a healthy body and a healthy mind, i.e., the rearing and training of individuals who have learned to control themselves and their environment.

From a national and a social standpoint the prevention of mental disease involves the exclusion of immigrants whose capacity for mental adjustment is low. During the last nine years 65.05 per cent. of patients admitted to the Brandon Hospital for mental diseases were born outside of Canada, though at the time of the last census (1911) only 41.87 per cent. of the population of Manitoba were born outside of Canada. From 1912 to 1915, the proportion of non-Canadian born was almost constant, at about 70 per cent. Since 1916 the cessation of immigration due to the War has had an effect, and the percentage of foreign born admitted has steadily decreased, though it is even yet too high. The conclusions are obvious. Stringent regulations are required to prevent those physically and mentally unfit from entering or becoming citizens of Canada.

The prevention of mental breakdown, so far as our present knowledge and control permits, is to be attained by active steps in four main directions:

1. Medical and Social. By the adequate prevention and treatment of alcoholism and syphilis.

2. Heredity. By steps to prevent the bringing into the world of individuals likely to have a mental breakdown. This may be attained to some extent by contraceptive measures, and possibly, in certain cases, by sterilization, but chiefly by building up high social ideals and a strong and enlightened public opinion, and by emphasizing the true object of matrimony.

3. Developmental. Ensure for each child a healthy body. Develop in each individual healthy habits of thought and objective interests, taking care that more youthful or inefficient modes of adjustment do not become fixed. Balance properly the child's physical and mental activities. Face frankly and take steps to counteract abnormal tendencies in the child. Open out the child with a sensitive and "shut-in" personality. Teach the psychopathic or neurotic child to control himself. Guide the boy and the girl through the troublesome period of puberty. Sex knowledge should be imparted to the child in the home by the parents as it is spontaneously demanded.

4. Immigration. Wise and well enforced immigration laws are required.

Today, as was the case with tuberculosis twenty years ago, the problems of mental disease are viewed with pessimism by the majority of the medical profession, but this attitude is changing and within a few years will, as in the case of tuberculosis, be replaced by a healthy optimism. In both tuberculosis and mental disease, however, prevention is better than cure.

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LATENCY IN SYPHILIS

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AT the "All American Conference on Venereal Diseases" held in Washington in December last, the following conclusion with regard to the Wassermann reaction was unanimously reached.

1. "That a frank, reliable, positive Wassermann should be regarded as a symptom of syphilis.

CAUTION—(a) In the absence of all other evidences of syphilis, a diagnosis of syphilis upon a positive Wassermann reaction alone should be made with great caution.

(b) In the absence of all other evidences of syphilis the Wassermann result should be verified by several repetitions at the hands of different observers, if possible. The presence of other conditions which might cause a positive Wasserman should be excluded as far as possible.

(c) There should be a very careful search for other evidences of syphilis, including clinical, serologic, pathologic, and other examinations.

CONCLUSION—After all of the above conditions have been complied with, a positive Wassermann should be assumed to be evidence of the existence of syphilis."

"IT WAS FURTHER RESOLVED: That

the negative Wassermann reaction should be interpreted in terms of the following limitations and conditions:

(A) "In differential diagnosis of Syphilis, a negative blood Wassermann test cannot be regarded as evidence of the absence of the disease.

(B) "In the early primary stage of Syphilis, the blood Wassermann test is expected to be negative.

(C) "In the active secondary stage, a repeated negative blood Wassermann test is a rare occurrence, and should be accepted only after a very careful examination of the case.

(D) "In all forms of late Syphilis, especially in those which have been treated, and in women in whom the disease may be otherwise symptomless, it is not uncommon to meet with a negative Wassermann reaction, and too much importance should not be attached to such a finding in suspected cases.

(E) "For purposes of diagnosis, attention should be drawn to the importance of recognizing by repeated tests, the transmission from the negative to the positive blood Wassermann in primary stages of the disease.

2. "A Wassermann test should be applied

in every case in which there is any suspicion of syphilis, but the positive or negative outcome of the test should be interpreted in the terms of the clinical picture the case presents.

"The so-called routine Wassermann test, while a valuable aid in diagnosis, should not be used as a substitute for general clinical examination."

A positive reaction carried out in accordance with the conditions named, even though there be no clinical signs of disease, need cause us no uneasiness as we can accept its presence as evidence of disease, and treat accordingly.

A persistently negative reaction, in the absence of clinical evidence of disease, may mean that the disease is cured, or has become latent, and it is our inability to decide definitely which of these two states has resulted, that may cause us some uneasiness. Symmers, Darlington and Bittman found that in 31.56 per cent. the Wassermann was negative, according to the antigen employed, in cases which showed characteristic syphilitic lesions at autopsy.

It is customary to make use of a provocative injection of neo-salvarsan in order to determine whether the negative Wassermann means that the disease is cured, or is merely latent.

The observations of Strickler, Musson and Sidlick, that intravenous injections of salvarsan in non-syphilitic patients with a previously negative Wassermann reaction, are followed in more than half the cases by a positive reaction, would indicate that the results of provocative doses are questionable. Umbert has given us seven postulates of cure, viz., time elapsed; interval between infection and treatment; the sum total of clinical manifestations of the disease; nature of treatment; the last manifestation of the disease; the state of the patient's health; and a series of negative Wassermann reactions carried over a long period of time. These seven factors are useful but are not absolute.

We base our cure of syphilis roughly on absence of clinical signs and a series of negative Wassermann reactions.

If it is true that a negative Wassermann means practically nothing, and it would appear to be so, for it is found that the Wasser-

mann reaction may be negative while the *Treponema pallidum* can be found in patches on the mucous membranes and even grown from the blood, then one of the hypotheses on which we base a cure is weak.

Notwithstanding the fact that a series of negative Wassermann reactions and complete absence of clinical signs is presumptive of cure, we should hesitate before making the assertion. It is undoubtedly true that we can cure syphilis before the stage of generalization is reached, and probably true as well after the stage of generalization, provided that treatment is carried out over a very long period of time, but just when we can pronounce a cure is a difficult thing to say.

In spite of our comprehensive knowledge of the disease, the annual death rate from syphilis in Germany is 60,000 and in France 30,000. The great majority of these cases have been treated, and undoubtedly many believed themselves cured. In this respect we do not appear to be much further advanced than we were before the advent of the arsenicals, and the Wassermann reaction. Nothing is more disheartening than to find the patient who has been cured return with a recurrence.

There is a vast difference between latency and cure, and one full of possibilities for the patient. Wrapped up in the word latency is the key to the cure of syphilis. When we know what is happening during that critical period, we will know when to pronounce the fatal word cure. We will also have a clearer understanding of the value of our therapeutic agents, and will be able to handle them to better effect.

Our present armamentarium consists of 1st. A knowledge of the *Treponema pallidum* outside the body. 2nd. Arsenicals, mercury, and iodides for treatment. 3rd. The Wassermann reaction for diagnosis and control of treatment. We need in addition, a full and complete understanding of latency. This promises a full and complete understanding of the life history of the *Treponema pallidum* within the body.

We know that during the stage of generalization the blood swarms with the organisms which, after a variable length of time, even without treatment, disappear from the blood and a period of latency begins.

To what is this disappearance from the blood due? Is it due to the immunological forces of the blood, phagocytosis, bacteriolysis, etc., which kill off great numbers of the organism, or is it due to the passage of the organism into a resting stage—spore formation—or is it some measure due to both?

It has been shown that the points at which the spirochaetes tend to accumulate in greatest numbers are the perivascular lymphatics.

Brown and Pearce have removed the lymph nodes from rabbits which were in the latent stage of syphilis—latent from three to six months—and by inoculating healthy rabbits with an emulsion prepared from these lymph nodes, were able in every instance to reproduce the disease. In every instance that an examination was made for the *Treponema pallidum* in the lymph nodes the results were negative. From these experiments it would appear that the *Treponema pallidum* exists in these lymph nodes during the period of latency in a form unknown to us, and given a congenial environment is capable of reproducing the disease.

These experiments would appear to indicate an ability on the part of the *Treponema pallidum* to enter into a resting or spore existence. In this connection the question that must naturally strike us is why the organism, in whatsoever form it exists in the lymph nodes, is unable to develop in the blood of the host? Undoubtedly it is due to an unfavourable environment which is the result of the serological forces of the body or, in the case of treatment, the therapeutic agents which we employ. Anthrax spores will develop only in the presence of oxygen.

Very few organisms in nature when subjected to deleterious influences completely die out. In unfavourable surroundings the organism develops a resistance which may be made manifest in various ways of which, as far as we know, the spore is the commonest. Our arsenical and mercurial preparations render the environmental conditions unfavourable to the existence of the *Treponema pallidum*.

Reproduction in the case of the *Treponema pallidum* is chiefly by longitudinal division. Transverse division, it is claimed by some observers, also takes place. If these observers are right, there must be here a fundamental

difference in the end product of these two methods of division. Does each half of the transverse division represent a resistant form of the organism—a spore? Male and female gametes and sexual reproduction by conjugation, encystment and spore formation have been described, and it is believed by some that the spores which are produced may be carried by the blood to distant parts where they develop under favourable conditions into *treponemata*.

We have here a condition analagous to malaria in which we find the female macrogametocyte, male microgametocyte and the neutral schizont.

There is this difference, that in the case of the *Treponema pallidum* conjugation between the male and female elements, it is said, takes place within the body of the host, whereas in the case of malaria conjugation takes place in the female mosquito.

In the body of the malarial host the microgametocytes die off, and the macrogametocytes are very resistant and remain in the body for a long time, until for some cause the resistance of the body is lowered, when they become active and develop merozoites by parthenogenesis which invade the red corpuscles and start the process anew. Is there a similar process in syphilis? In trypanosomiasis the multiplication of the trypanosome is by longitudinal division, but it may also take place by schizogony-asexual sporulation. At first Schaudinn thought that the spirochaete was allied to the trypanosome, but later on changed his views.

When we say that the disease is latent, do we mean simply that the patient has become a carrier. In other words do the *Treponema pallidum* and the immunological forces of the body declare a truce during this period of latency, and enter into a commensal existence?

May we believe that after a period of struggle this takes place, and the future of the patient will depend on the disturbance or maintenance of that truce?

The fact that the period of latency is usually longer in those who live a regular life and shortened in those who give way to excesses would point that way. Anything which tends to lower the resistance in malaria will cause a relapse. Alcoholism is a

common concomitant of aneurysm and degenerative encephalitis. A point of importance is whether or not the disease is latent in the sense of inactive. It would seem more rational to believe that this is in reality not a period of passive waiting on the part of the *Treponema pallidum*, but one of activity during which the organism is endeavouring to multiply and overcome unfavourable conditions. In all probability it is a period of activity on the part of the organism and the immunological forces of the body, for it is inconceivable that an organism can invade the blood without stimulating activity on the part of the protective forces of the body.

In all diseases there is a fight to a finish in which either the causative organisms or the body cells are victorious. We have examples of this in such diseases as: typhoid, scarlet fever, diphtheria, plague, cholera, etc. The patient may become a carrier after the disease is at an end, but he never suffers a recurrence. In trypanosomiasis the disease is invariably the victor. In malaria and syphilis there are recurrences over a period of many years, and it is difficult to believe that these recurrences are merely a disturbance of the commensal state which has resulted after a long period of struggle. One is justified in believing that the immunological forces of the body are constantly inhibiting the growth and development of the organisms, and that those organisms which do develop during the period of latency, are

taken up and destroyed by the body cells. The latent period would seem to be a time of constant activity and any lowering of the vitality of the host, throws the balance in favour of the *Treponema pallidum* with a resultant recurrence.

Once the *Treponema pallidum* has invaded the blood and the disease becomes generalized, its complete eradication becomes a doubtful matter. After this period it would appear that at best, our therapeutic agents only aid the body cells in preventing the further development of the *Treponemata* and the balance is in favour of prolongation of the latent period.

No doubt the fixed cells of the body play a part coequal with the cells of the blood in preventing the development of the organism.

During the time of latency in which the struggle is going on between the disease and the body, there is little, if any, pathological change, and the Wassermann reaction is negative. It is only when the organism begins to gain the upper hand that the Wassermann becomes once more positive and the disease is said to recur. The negative Wassermann obtained under these conditions is of no value, but on the contrary may lead to erroneous conclusions. Further advances will depend in a great measure on our understanding of what is taking place during the period of latency and exhaustive studies of the pathological and serological activities of this period are greatly needed.

COD-LIVER OIL WITHOUT PHOSPHORUS AS EFFECTIVE AS COD-LIVER OIL WITH PHOSPHORUS IN RICKETS AND TETANY*

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SINCE Kassowitz's (1) work on the influence of cod-liver oil and phosphorus on the calcium retention in rickets, physicians have universally employed this combination in the cure of rickets. Kassowitz believed that it was the phosphorus in this mixture that was effective and that the cod-liver oil was inert.

Later, Schabad (2) found, by metabolism observations, that there was a lessened retention of calcium and phosphorus in rickets.

To obtain a phosphorus retention, he added oil of phosphorus to the cod-liver oil. He tried oil of phosphorus with other oils, as olive oil, but could not obtain with these, uniform calcium retention. He noted that cod-liver oil alone had a significant effect, but ascribed a superiority to the combination of cod-liver oil and phosphorus.

Rosenstern (3) with many years of clinical observations, believes that the phosphorus is of no value, but that a greater amount of cod-liver oil must be given than of cod-liver oil and phosphorus.

Schloss (4) working after Schabad, thinks that the latter is not justified in his conclusions regarding the superiority of cod-liver oil and phosphorus over cod-liver oil. Schloss believes that it is the calcium intake that is most important, and that without sufficient calcium intake, cod-liver oil and phosphorus will not be of any use. If the calcium content of the food is not adequate, and a calcium compound such as acetate is given, the cod-liver oil and phosphorus will cause the calcium to be incorporated in the organism.

He considers this to be the case in breast-fed infants and rickets. These cases have a low calcium intake, and Schloss believes that they are not improved until calcium acetate is given in addition to the cod-liver oil and phosphorus.

From several hundred clinical observations, Schloss (5) concludes that the cod-liver oil has as great an effect on rachitic metabolism as cod-liver oil and phosphorus. For three years he has not used the phosphorus combination, even in cases of tetany, and has had as good results without it. He still believes that in breast-fed infants when the calcium content of the food is below normal, a cure can be effected by adding calcium, and omitting cod-liver oil. He does not seem to have tried adding calcium to artificial food when it was deficient, but his observations were on breast-fed infants that were given extra calcium.

Analysis of the milk of mothers with rachitic children shows that sometimes at least, the calcium content is normal. Holt and Courtney (6) have done considerable metabolism work on rachitic children, and have found a definite loss of calcium during florid rickets, and a gradual increase in the retention during healing, until the normal balance coincides with recovery. Their figures show that in rickets there is an abnormal loss of fat and calcium due to the large amount of feces excreted, although the percentage of fat and calcium in the stool does not vary materially from the normal. Holt and colleagues' analysis show 0.0458 gm. calcium in 100 c.c. mature breast milk, and as a low limit 0.1692 gm. calcium in 100 c.c. cow's milk. Thus the amount of calcium in cow's milk is 3.5 to 4 times that of breast milk.

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Hence any ordinary whole milk and water feeding would necessarily contain sufficient calcium; only a high top-milk dilution would give too low calcium.

These investigators have further shown that there is a better percentage absorption of calcium in breast-fed infants, than bottle-fed, and in addition, that there should be a certain fat intake for the best retention of calcium. This relation should be from 0.045 to 0.060 gm. calcium per kilo and 4.0 gm. fat per kilo of body weight to give the optimum effect of calcium retention. In considering the fat intake, one should remember that the cod-liver oil will augment the diet, as a teaspoonful weighs 5 gm. and is about 100 per cent. fat.

There does seem, however, to be some other factor to be considered besides an adequate calcium and fat intake; for calcium storage. Osborne and Mendel (7) have found that cod-liver oil contains a high percentage of the growth element "fat-soluble A" and this constituent seems to us to be essential for the normal storage of calcium.

With sufficient calcium and fat in the diet, supplemented by the cod-liver oil, containing a large percentage of "fat-soluble A" there should be ideal conditions for the absorption of calcium and its incorporation in the tissues.

In a previous paper (8) by the authors, it was shown that cod-liver oil and phosphorus produces an increase in the blood calcium with a corresponding reduction in the mechanical and electrical signs of Tetany within a period of ten to seventeen days. Our present study consisted in observations conducted along somewhat similar lines to determine whether or not the phosphorus contained in the cod-liver oil was of any benefit in effecting a cure of either rickets or tetany. As stated in our last paper, we consider that all cases of tetany show signs of rickets in varying degree. We have used cases of tetany intentionally, as it is possible to estimate the progress in these cases more accurately than in uncomplicated rickets—e. g. by means of the galvanic battery, and the presence of the mechanical signs of tetany.

CASE REPORTS

N.B.—In every instance the children were

fed rational amounts of milk and water with added carbohydrate.

Case 1.

1. B.—Age 6 months.—Admitted Jan. 13th.

The patient had been breast-fed for 3 months, then Allenbury's food was given for 1½ months. Following this boiled milk and water formulae were given until admission.

Patient was brought to the hospital on account of many convulsions during the week previous to admission.

On physical examination the child was found to have some parietal bossing and a slight rachitic rosary, was very irritable, showed very marked laryngospasm, carpopedal spasm, and definite Trousseau's and Chvostek's signs. The electrical irritability was very much increased.

On Jan. 16th, plain cod-liver oil without phosphorus was begun in 20 minim doses, three times a day. On Jan. 19th, the calcium content of the blood was 6.6 mg. per 100 c.c. The mechanical irritability began to decrease about Jan. 30th, but did not disappear until Feb. 8th. The electrical irritability began to decrease on Feb. 3rd, and became normal on Feb. 11th. The blood calcium showed a definite increase on Feb. 4th, and reached normal point on Feb. 16th. At this date observations were discontinued, but

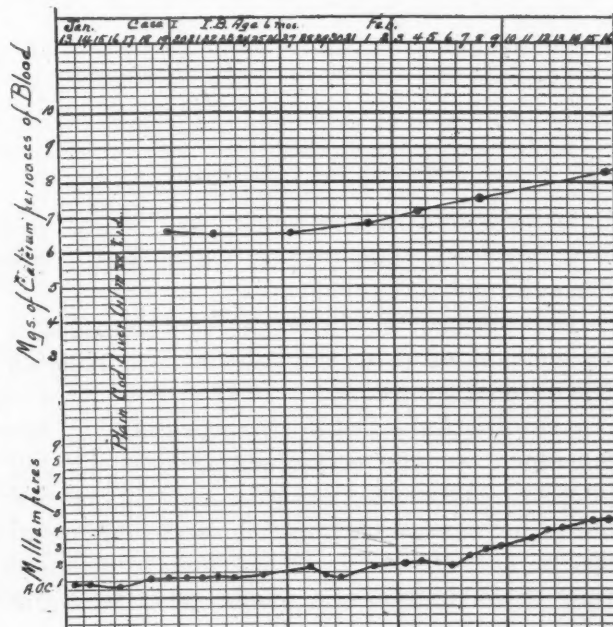


Fig. 1. Shows the gradual reduction (lower line) in Case 1 in the electrical irritability under the influence of cod-liver oil without phosphorus. The upper line shows the gradual increase in blood calcium.

the same amount of cod-liver oil was continued throughout the child's stay in the hospital.

Case 2.

R.B.—Age 3 months.—Weight $7\frac{3}{4}$ lbs.—Admitted Jan. 20th.—Discharged Mar. 13th.

This child had been nursed for $11\frac{1}{2}$ months, with a supplementary feeding of milk and barley water for the last two weeks of breast feeding. Following this and until three

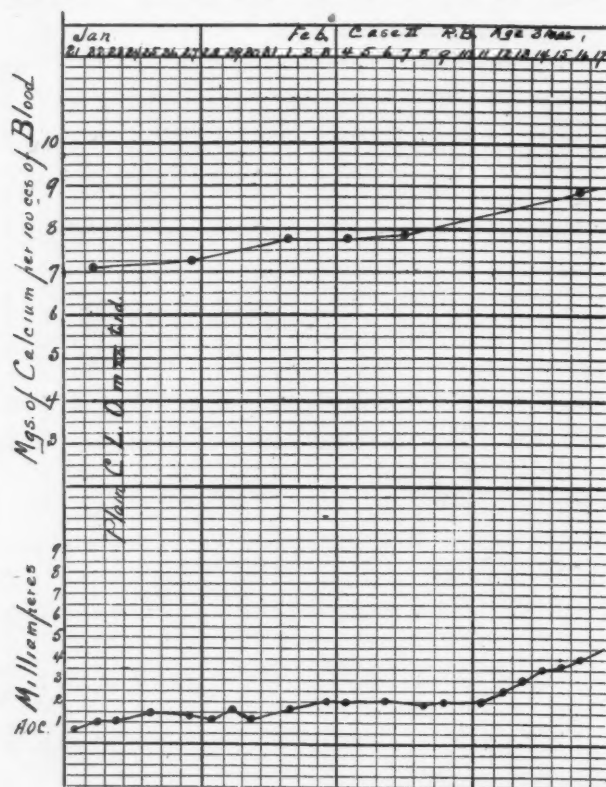


Fig. 2 (Case 2) shows as in Case 1 the gradual reduction of electrical irritability coincidently with an increase in the blood calcium.

days previous to admission she was fed Nestle's food, then a milk, water and sugar formula.

The patient was brought to the hospital on account of three convulsions occurring on the date of admission.

Examination—Craniotables present, no enlargement of the epiphyses and no bossing present. Trousseau's signs and Chvostek's both present, carpopedal and laryngeal spasm not observed. Electrical irritability very much increased. These positive signs were not very pronounced.

On Jan. 23rd, the administration of plain cod-liver oil 20 minims, three times daily was started. At this time the calcium content of

the blood was 7.1 mg. per 100 c.c. The electrical irritability, the mechanical signs of tetany and the calcium of the blood remained about the same with the same dosage of plain cod-liver oil until Feb. 9th. From this date until Feb. 15th, the signs began to disappear gradually, no tetanoid signs remained, and the blood calcium had reached 8.9 mg. per 100 c.c.

Case 3.

M.G.—Age $9\frac{1}{2}$ months.—Weight 11½ lbs.—Admitted Jan. 29th.—Discharged Mar. 25th.

This child had been breast-fed for two months, then given a milk, water and sugar formula, unboiled, for 7 months, and finally for two weeks previous to admission had had a sterilized, 3 per cent. dairy modification.

The infant was brought to the hospital because of frequent convulsions with very marked laryngospasm during the previous six weeks.

On examination it showed slight epiphyseal enlargement and parietal bossing, very marked Trousseau's and Chvostek's signs, with carpopedal and laryngeal spasm. Electrical irritability was quite diagnostic.

On Feb. 3rd plain cod-liver oil 20 minims, three times daily was begun; at this juncture the calcium content of the blood was 6.3 mg.

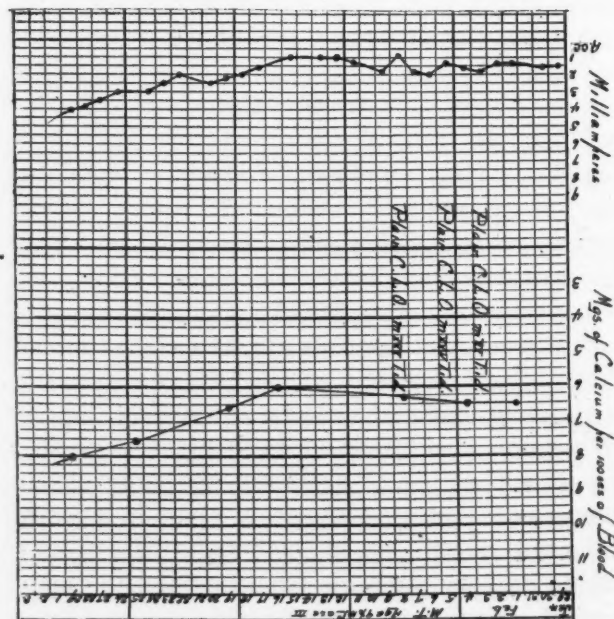


Fig. 3 (Case 3) shows at first a gradual decrease in blood calcium during the first two weeks followed by a gradual increase with a corresponding reduction the electrical reactions.

per 100 c.c. of blood. On Feb. 5th, child had several convulsions—plain cod-liver oil was increased to 25 minims, three times daily. On Feb. 8th, the calcium content of the blood was 6.3 mg. and electrical irritability still quite marked. On Feb. 10th plain cod-liver oil was increased to 30 minims, three times daily. Electrical irritability remained about the same until about Feb. 20th, when it began to decrease. The calcium content of the blood began to increase about this time with a lessening of the mechanical signs: by Feb. 29th all mechanical, electrical and chemical signs of tetany had disappeared and observations were stopped.

Case 4.

1.H.—Age 10 months.—Admitted Feb. 21st.

This child had been nursed for 4 months, she was then fed on condensed milk until 4

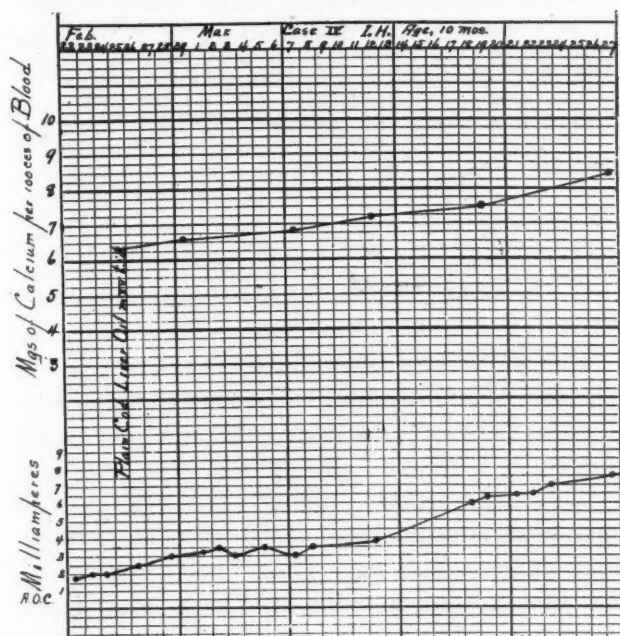


Fig. 4 (Case 4) shows the gradual reduction of electrical irritability with a corresponding increase in the blood calcium under the influence of plain cod-liver oil.

days before admission, when she was given a milk, water and sugar formula.

During two days previous to admission the patient had had 6 convulsions and had been making "crowing noise" when breathing.

On physical examination the infant showed very marked signs of rickets, enlarged epiphyses, frontal and parietal bossing, rachitic rosary and sulcus. There were, in addition

very marked mechanical signs of tetany, viz.: Chvostek's and Trousseau's signs, carpopedal and laryngeal spasm. Definite electrical irritability and decreased calcium content of the blood.

On Feb. 25th plain cod-liver oil was begun in 15 drop doses, three times a day. There was no very definite change in the findings until about March 12th, when the mechanical signs became less marked and the electrical irritability became much reduced. The calcium of the blood also increased from 6.7 mg. to 7.2 mg. per 100 c.c. of blood. On March 19th there were no more mechanical signs and no abnormal electrical irritability. Observations were continued until March 27th at which time the calcium content of the blood had increased to 8.4 mg. per 100 c.c.

Case 5.

E.G.—Age 7 months.—Admitted Feb. 25th.—Discharged Mar. 27th.

The child was brought to the hospital on account of "choking spells" during the previous four days.

Patient had been breast-fed for one month and from that time until admission has had boiled milk, water and sugar formula.

On examination, the child was found to

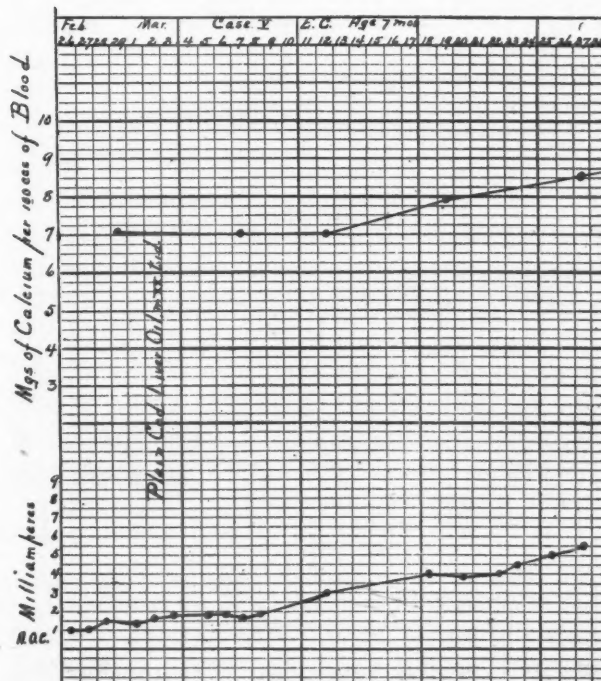


Fig. 5 (Case 5) shows a stationary blood calcium for the first two weeks followed by a gradual increase coinciding with a reduction in the electrical signs.

have marked frontal and parietal bossing and definite rachitic rosary. Chvostek's and Trousseau's signs were easily elicited, there was very marked laryngospasm and some pedal spasm. Electrical irritability was much increased and the calcium content of the blood moderately reduced.

The administration of plain cod-liver oil 20 minims, three times daily, was commenced on March 2nd, and continued throughout the period of observation. There was no definite change until about March 12th, when all findings began to approach normal. About March 22nd, the mechanical and electrical signs had disappeared and the calcium content of the blood had increased to 7.9 mg. per 100 c.c. Observations were continued until March 27th, the calcium of the blood at this date had increased to 8.4 mg. per 100 c.c.

Case 6.

W.H.—Age 4 months.—Admitted March 18th.—Discharged April 24th.

The patient was brought to the hospital because he had had a convulsion on the previous day. He had always been troubled with

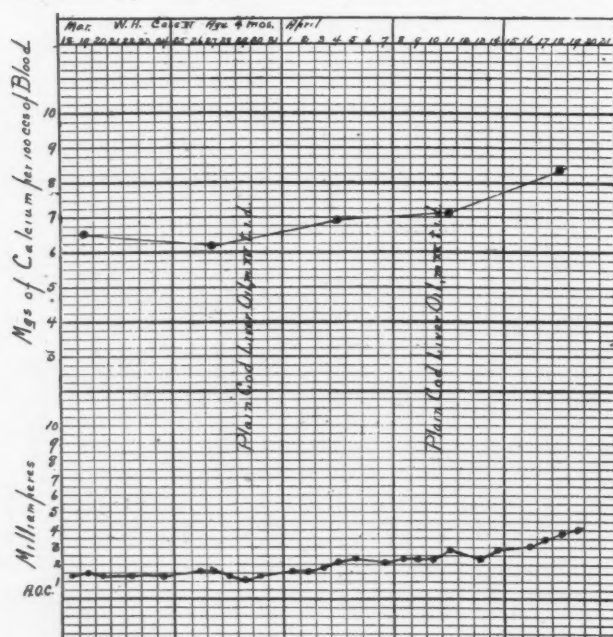


Fig. 6 (Case 6) shows gradual reduction of the electrical irritability coinciding with an increase in the blood calcium.

constipation and vomiting. The mother described a "croupy" cough which he had had for one month prior to admission, but this was never heard while on the wards.

The previous feeding had almost entirely consisted of patent foods without the administration of any oil or orange juice.

On physical examination, there was definite cranio-tabes, rachitic rosary, and flaring of the ribs at the costal margin. Chvostek's and Trousseau's signs were both present and there was quite marked electrical irritability with decreased calcium content of the blood. The administration of plain cod-liver oil was not begun until March 29th, when 15 minims, were given three times a day. At this time all the signs had become aggravated, but within a few days there was some improvement in all directions. On April 4th, the calcium content of the blood had increased to 6.9 mg. per 100 c.c., and the electrical irritability had commenced to lessen. For one week following this period there was very little change in the signs, so the dosage was increased to 20 minims, three times a day. This increase was followed by a rapid disappearance of all signs of tetany. Observations were discontinued on April 18th, at which time the blood calcium was 8.3 mg. per 100 c.c.

Case 7.

W.H.—Age 8 months.—Admitted April 12th.

The child was brought to the hospital on account of having had three convulsions during the previous 24 hours and also a "crowing noise" off and on during the previous two months, while crying. He had always been constipated and vomited occasionally. This patient had only been breast-fed up to the age of four months, and from that time until admission had been fed milk, water and sugar mixtures.

On examination there was found some parietal bossing and slight rachitic beading of the ribs. The mechanical signs of tetany were all quite marked. The electrical irritability was also quite definite and the child had several convulsions during examination for which magnesium sulphate, 8 per cent. subcutaneously was employed.

The calcium content of the blood was 6.1 mg. per 100 c.c. On April 12th plain cod-liver oil 15 minims, three times daily, was begun and was increased to 20 minims, three times a day, on April 16th.

There were no convulsions following the first day in hospital.

The mechanical signs became less marked about April 24th, the electrical irritability became less, and the calcium content of the blood began to increase about the same time. The mechanical and electrical signs had completely disappeared by May 4th, and on May 9th, the calcium content of the blood had become normal. At this point observations

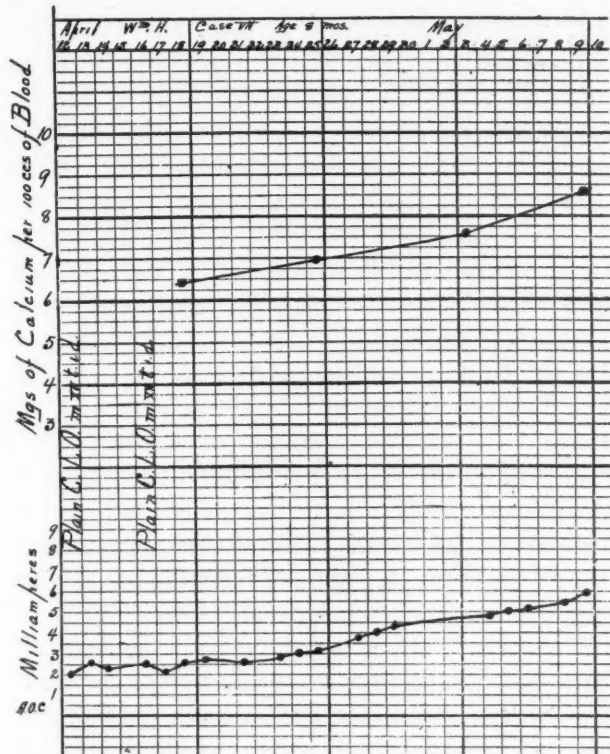


Fig. 7 (Case 7) Findings as in Case 6.

were discontinued, but the plain cod-liver oil, 20 minims, three times daily, was continued.

DISCUSSION

From a perusal of these protocols and charts, it will be seen that the results are identical with the observations in our previous paper. Thus phosphorus is unnecessary in the cod-liver oil. This statement may be strengthened by the fact that we have obtained similar cures in many other cases in which the blood calcium was not estimated.

From a careful consideration of the cases reported in this and the previous paper, combined with the observations of Holt and colleagues, and Schloss, we have arrived at certain conclusions:—first, that an adequate

amount of fat must be taken and second, that there must be sufficient "fat-soluble A" along with the fat.

To substantiate these statements we have calculated the fat requirements on Holt and colleagues' basis, and compared them with the fat intake in each case under treatment. We found that in the sixteen cases (both papers) in only two instances was the fat intake not quite up to the fat requirements, and in these two cases, the cure was a little more prolonged than the average. In each instance, the fat intake included a certain amount of cod-liver oil in addition to the ordinary milk-fat.

Our findings are quite in agreement with those of Hess and Unger (9) who consider that the "fat-soluble A" vitamine in cod-liver oil probably differs both quantitatively and qualitatively from the same element in cow's milk fat. It is quite probable that the "fat-soluble A" as it occurs in cow's milk fat is not sufficient to prevent rickets, for certainly it has been proven clinically many times that large quantities of milk alone do not protect against rickets and that a small amount does not lead to its development. Some further light on this point in question has been thrown by Dutcher and co-workers (10) who found that the vitamine content of cow's milk is dependent upon the vitamine content of the ration ingested by the cow; that is to say, that milk tends to deteriorate when the diet of the cow is low in vitamins, while the milk becomes of higher nutritive value, also immediately upon the ingestion of a vitamine-rich ration.

It thus appears that while milk fat contains a considerable proportion of the anti-rachitic vitamine it cannot always be relied upon to cure; it may, however, be augmented by the addition of cod-liver oil, the combination of these two alone is sufficient not only to protect against rickets, but actually to effect a cure.

CONCLUSIONS

1. Cod-liver oil without phosphorus produces regularly an increase in the blood calcium with a corresponding reduction in the mechanical and electrical signs of tetany in approximately the same time as is effected with cod-liver oil and phosphorus.

2. Provided there is a fat intake of 4 mg. per kilo which ensures the best calcium absorption, the addition of the growth factor "fat-soluble A" as contained in plain cod-liver oil is enough either to prevent or to cure rickets.

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ACIDOSIS*

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IN this short paper of Acidosis, I have endeavoured as far as possible, to eliminate all chemical problems, and to use and explain only clinical facts.

In order, however, to understand why certain facts lead us to a diagnosis, and why we base our treatment on these facts, it is necessary for us to have a superficial knowledge of what occurs in the body during acidosis. The blood as we know is alkaline, kept constantly so chiefly by its bicarbonate content, and it is so slightly alkaline, that during health there is little or no change in its reaction, despite changes in the acid or alkali intake, or in their production in the body. If then this bicarbonate content of the blood is disturbed by the introduction of acid, we get symptoms and general changes in the whole organism which we call acidosis. It seems necessary then, to have a change in the bicarbonate of the blood plasma before acidosis can be said to exist.

Naunyn who first gave a name to this acid condition, recognized only one type, that associated with the production of acetone bodies. Since then many other forms have

been noted, and it might be well to designate a few of them as the conditions in which they occur are so numerous.

The best known type is that associated with diabetes and the development of acetone bodies and indeed it is from this particular type that the largest amount of our information about this condition has been accumulated.

Nephritis on the other hand is a disease in which a tremendous acidosis may develop, associated in no way with acetone bodies but due rather to the retention or improper secretion of the normal acids of metabolism, plus perhaps some derangement of the liver function with which we are unacquainted. Diarrhoeas severe enough to drain away the alkalis, or vomiting severe enough to prevent their intake, together with numerous other causes are all contributory to this condition. Anaesthetics seem to me to deserve special mention, because of the frequent appearance of diacetic acid in the urine after their administration.

It looks to me as if too much fuss has been made about this usually mild condition, and if we consider the fact that it rarely produces any grave results it would be better to ignore

*Read at Annual Meeting of the Manitoba Medical Association.

its presence. Its degree is, after all, the main point to establish, and if one of the several very excellent methods at our disposal were used for estimating its intensity, a good deal of the fear its presence excites would be dissipated, and the patient who has probably already suffered at the hands of the surgeon, would not have to undergo the added discomforts of the treatments now used.

During the course of normal metabolism acids in considerable amounts are being constantly produced, but, so efficient is the mechanism for the elimination of these acids, under usual conditions, that they do not disturb, or in any way change the daily course of events. When, however, for any reason an increased accumulation of acids has taken place with an insufficient mechanism for their elimination, then the balance of the whole alkali reserve of the body is disorganized, the bicarbonate of the blood plasma as we have already mentioned is altered and we get a condition of acidosis.

The main sources of elimination of acids are through the kidneys and lungs, the blood carrying them to the organs as they occur. It is therefore from these sources that the bulk of our information is to be obtained both as to whether an acidosis exists, and as an estimation of its degree of intensity.

By way of the lungs, because of their easy accessibility, we are able to gain a vast amount of information. The very efficient and simple apparatus devised by Marriott for the estimation of the CO₂ tension of the alveolar air, will not only confirm the diagnosis, but will estimate at the same time the amount or degree of acidosis existing. This tension in a normal person measures about 40 or 50 M.M. of Hg., but in one with acidosis it falls and in the very severe types associated with diabetes or nephritis, may go as low as ten or even lower.

This fall in the CO₂ tension is brought about in this way. We have seen that the bicarbonate content of the blood during acidosis is changed towards the acid side, but that normally this is kept at a constant level. When therefore this change toward the acid side takes place, due to the flooding of the blood by the strong non volatile acids such as di-acetic or oxybutyric, this buffer salt of bicarbonate is depleted and CO₂ is set free.

This excess CO₂ must be eliminated or reduced to prevent a very serious change in the reaction of the blood. The respiratory centre, which is most sensitive to the slightest disturbance of the normal blood reaction, is now stimulated on account of this change, and responds accordingly with an increase in pulmonary ventilation giving us the symptoms of hyperpnoea or air hunger.

The purpose of this deep breathing—the rate of which may or may not increase—is to lower the concentration of the CO₂ in the alveolar cells, so facilitating its escape from the tissues, the result being that the greater the acidosis the lower will be the CO₂ tension, and the greater the acidosis the more pronounced will be the air hunger. It will be seen then that while this lowered CO₂ tension is designed to prevent any dangerous change in the blood reaction it does not prevent a diminution of its bicarbonate content.

While the estimation by the lung has much advantage over the kidney because of its accuracy and simplicity, still the urine on the whole is reliable and gives us much valuable evidence, and if we recognize our types will not be a source of error, but is very likely to fail us when we estimate degree. Taken in conjunction, however, with the CO₂ tension, one will help to check the accuracy of the other. The presence of di-acetic acid in the urine will serve to inform us that acidosis is present, and will give us by the intensity of its reaction a rough idea of its degree. This for routine is the most useful and easiest method, and if associated with diabetes is always important.

The estimation of the ammonia output is another very valuable and more accurate test than that for di-acetic acid, because of its variation from normal in acidosis. During normal metabolism this is in large part carried to the liver and there converted into urea. When, however, acidosis exists, much of this ammonia is used as one of the defences against that condition. It unites with the acids to neutralize them, and is put out in that combined form. The normal output is about 1 to 1½ gms. daily, but as this varies somewhat, it is usually estimated that 2 gms. or over means acidosis, and of course the greater the acidosis the greater the amount excreted. This estimation can be shortened by six hour specimens, or by es-

timating it on a percentage basis if one is hurried and cannot wait for the 24 hr. specimen. There are traps here, however, in which one may get caught if he is not wary. We have seen that the very gravest type of acidosis may exist with nephritis. If then, we rely on either the detection of diacetic acid, or the estimation of ammonia to make our diagnosis, we may fail, for di-acetic acid may be absent, and the ammonia may be normal or less than in health. This illustrates the advantage of the lung over the kidney for the detection or accurate estimation of the degree of acidosis.

1. Sellards test is another method, easily done and very useful. It is based on the amount of bicarbonate of soda necessary to render the urine alkaline. In children usually 2 or 3 gms. will be sufficient, while in older children and adults 5 gms. overcome the acidity. When acidosis is present, however, much larger amounts are necessary to obtain this end. One must remember, if we are to accept recent opinions on acidosis, that alkalis are contra-indicated in diabetes and therefore this test cannot be used in acidosis of that type.

2. Of greatest importance is the chemical examination of blood in which an estimation of the CO_2 or measurement of the alkali reserves is admittedly the most accurate of all. For the present this has not been open to us for various reasons.

The treatment of acidosis presents so many problems that it is out of the question to deal with all in this short paper, and as the acidosis occurring in diabetes is our chief type we will use that as a basis for this discussion.

Theoretically the administration of alkalis would seem to be the obvious method of combating this condition, for as has been shown the alkali reserve of the body has been, or rather is being, used up and it is our business to replace it, but clinical experience has proven that this method of procedure is not very successful, and while it may be useful in some cases, it is after all merely symptomatic treatment without consideration of the cause. Besides the use of alkali is not free from danger, and the large doses often necessary may cause such irritation of gastro intestinal tract that they will induce vomiting, a condition we are particularly

anxious to avoid. Then again when alkalis are taken over long periods, they tend to deplete the body of necessary salts, particularly chlorides, and when given intra-venously during severe diabetic acidosis tremendous amounts of acetone bodies seem to be liberated from the body cells, doubling, or trebling their concentration in the blood. Whether this produces toxins which kill the patient is not known, but not seldom they promptly die.

Since recent work has shown that fat is the chief source of acetone bodies, it seems more profitable to attack the problem from that angle, and it has proven to be the best method for combating, and preventing that condition. Joslin, who was the first to champion this treatment has had remarkable results, and a great decrease in the number of deaths from this cause. In diabetes the assimilation of carbo hydrate is interfered with, and because of this the combustion of fats is not complete. They smoke as it were, and the smoke represents the acid bodies. This same form of reasoning may apply to any form of acetone body formation, as for example starvation acidosis, but it does not necessarily imply that the treatment must be the same.

The elimination of fat from the diet is then our first concern when we are called upon to treat an acidosis of the diabetic type. If you will permit me I would like to point out here that one cannot give too minute instructions as to what is or is not fat. Many people regard fat as only that associated with meat, and will eat butter and eggs, drink broth or milk in blissful ignorance, quite certain they are following instructions.

Fluids are perhaps the next most important adjunct in treatment after the elimination of fat from the diet. The retention of these by the body is a great necessity in order that the acids formed may be got rid of and diluted. This will be readily understood when we consider the fact that acid bodies are never found in the urine in a higher concentration than 1.5 per cent., and this concentration only in coma, .6 being about the highest outside of coma. It is evident therefore that the elimination of acids is directly dependent on the amount of water excreted.

Joslin has for this reason laid down the

general rule in his words, that any patient with acidosis should get 1000 c.c. of fluid every six hours. That in order to avoid overburdening the stomach and causing vomiting with its consequent loss of body fluid they should be given in small quantities at a time. The contra-indications for this treatment are oedema from any constitutional cause such as in nephritis or failing heart.

Salt is another important consideration in treating acidosis. It is obvious if there is salt retention and oedema, that it, as well as fluids, should be restricted, but its sudden withdrawal in diabetes may precipitate an acidosis that could otherwise have been avoided. This sudden withdrawal increases

the urinary output and depletes the body of its necessary liquid, it is therefore advisable that broths, fat free, but rich in chlorides should be included in the fluid intake. Salt on the other hand may act as a diuretic, so one has to be careful not to allow the patient to choose his own amounts. That which is contained in broth is usually sufficient.

Alcohol is often freely used in acidosis for it has been agreed that a patient can take more fat if he is also taking some alcohol. Its chief action appears to be its virtue in preventing the combustion of fat, thus lessening the production of acid bodies. When used it should be given in very diluted form and if diabetes without sugar.

To those needing orientation—and who does not need it? in the domain of the study of the Internal secretions—a review of the subject as it relates to the Pituitary Gland, by Prof. Harvey Cushing in a recent number of the J.A.M.A. comes as a most refreshing albeit extremely cautious summary.

He lays stress on what needs to be still further emphasized, the slow progress of actual knowledge in the realm of Endocrinology, and the very rapid growth of speculation, and the cheerful adoption by many of airy fancies as solid facts. There is no doubt that upon a foundation of such fancies with a fact here and there stuck in, may be built up a very brilliant therapeutic system, in which a dash of this gland for that symp-

tom, and of that gland for the other symptom may finally come to differ from the polypharmacy of another generation only in the substitution of animal's 'insides' for vegetable tinctures.

That the laboratory worker and clinical observer are pushing forward the confines of knowledge surely, if slowly, Dr. Cushing would not have us forget, and in the meantime while we "let knowledge grow from more to more" there remains as regards the matter of therapeutic the attitude of Rational Empiricism so aptly set forth by Prof. Rudolf at the recent meeting of the Canadian Medical Association, of which the motto might well be "Prove all things. Hold fast that which is good".

THE REPAIR OF BONY DEFECTS OF THE CRANIUM*

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THE late war brought the subject of the repair of defects of the vault of the skull to the attention of all military surgeons who were called upon to treat the wounded invalided home suffering from the effects of the loss of large portions of bone from the cranium.

Nearly all these wounds of the skull were septic and in a large percentage of cases loose or necrotic bone had to be removed at hospitals near the front or later at hospitals far removed from the battle zone.

In civilian practice it is not rare to meet with identical defects of the skull produced at operation as falls from a height or by result of flying missiles or machinery accidents such as the bursting of emery wheels.

It is not my intention to refer to small deficiencies in the skull without involvement of the meninges or brain and causing no symptoms, nor to large defects purposely made for decompression, where it is intended that the opening shall remain.

When the hiatus is present in the frontal, parietal or occipital bone above the superior curved line, it is usual to have symptoms of unstable intracranial equilibrium. Where strong and thick muscles cover the vault as in the temporal or subtemporal regions, the brain is amply protected and supported, so openings here seldom require any operative interference.

It may be very difficult to differentiate symptoms caused solely by the presence of a gap in the bone with hard unyielding margins from those due to the effects of injury to the underlying brain or to the presence of some foreign body.

Where a large opening exists, there is visible pulsation or an impulse on coughing or during strong expiration. Where the hole is very large a protrusion may even be seen on sudden effort.

The symptoms from which the patient suffers,

vary considerably in individual cases. The usual manifestations are: Headache, blurring of vision; dizziness, especially when in a stooping position; and perhaps intolerance to bright lights or loud noises. Insomnia may be troublesome.

These patients may complain of pain and vertigo when the scalp over the hiatus is even gently pressed upon. The fear of impending death from pressure or blows on the unprotected area often gives the patient great anxiety. Any of these above-mentioned symptoms may be present in a single case alone or in combination.

The writer has been struck with the fact that openings near the base of the skull are usually associated with much more suffering than those situated at a higher level, but this does not apply in every case.

A disfiguring, depressed, pulsating area in the frontal region is surely worthy of repair, with the slight risk of operation, from a cosmetic standpoint alone.

The wearing of some form of pad or plate over the scalp is of very doubtful value, for although it may give to the wearer a sense of protection from trauma from without, it plainly serves no useful purpose in protecting the brain from the constant jarring against the sharp or uneven margins of the aperture.

Cases are on record where Jacksonian epilepsy has been cured by cranioplasty alone, but it must be understood that this operative procedure cannot possibly change or remedy gross lesions of the underlying brain, the more probable cause of this malady.

There are several contraindications to the operation of cranioplasty with its various modifications, i.e., (a) The existence of grave constitutional or other disease, such as would contraindicate any operation of expediency; (b) The presence of a cough is, for the time at least, a

*Read before Section of Surgery, Academy of Medicine, Toronto, November 16th, 1921.

contraindication, for there is danger that the graft may be displaced and, furthermore, when transplants are taken from the lower thoracic region, coughing causes much distress following operation. Consequently cough or bronchitis, if present, must first be cured before attempting repair.

The size of the defect is no barrier to operation for the larger the aperture the greater is the necessity for plastic surgery. The presence of sepsis is fatal to success, but when the original wound is soundly closed and the scar free from adherent scales, operation may safely be performed. No attempt should be made to close the breach if there is a hernia cerebri present or increased intracranial tension.

Many operations have been devised for the closure of cranial defects, such as the use of decalcified bone plates, sliding osteo-periosteal flaps from the neighbouring external table of the skull, autoplasmic or homoplasmic bone grafts have been used with success. Plates of gold or silver, plain and perforated, or ivory plates, are all open to the objection that they are not absorbable and may act as irritants, although one author reports six cases where perforated silver plates were employed with success in every case. And lastly, the use of autogenous cartilage grafts should be mentioned. This method was first described by Morestin in 1916 and the operative technique was later improved by Villandre of Lyon.

The advantages of this method of procedure are many. The writer has followed this plan in six out of seven cases and has been so well satisfied with the results that any remarks that may follow will be devoted particularly to this procedure.

To enumerate briefly some of the advantages which are claimed in favour of autogenous cartilage grafts over other methods for the closure of openings in the skull: 1. The risk is practically nil and the shock is slight or absent and the suffering following operation is not great. 2. The grafts are autogenous, easily procured and in any reasonable amount. 3. The recovery is speedy and uneventful and the results eminently satisfactory. 4. There is no need to wait longer than the time necessary to procure a clean external wound before operating; this saves much time as compared with the tedious delay, usually six months, which is absolutely essential to ensure success when bone grafts are employed. 5. Cartilage seems to possess a power of resistance to infection unknown to bone grafts. 6. The operation is simple and requires no special instruments whatever. 7. On curved surfaces, such

as in the frontal bone, better cosmetic results are obtained from the ease with which the graft may be moulded to the contour of the surrounding bone.

Technique of operation. The patient's scalp, chest and upper abdomen are shaved and the operation-areas are painted with iodine solution and suitably covered with sterile towels of a screen. The attachment to patient's forehead, between anaesthetist and operator is advised, but is not essential. The anaesthetic may be either chloroform or ether. Local anaesthesia, for many reasons, is not to be recommended. The intratracheal or intrapharyngeal method of induction is excellent. Rectal administration would seem ideal, but it has been found to be uncertain in its effects and even dangerous at times.

The skin incision must be carefully planned in order to avoid unnecessary scarring in exposed regions, such as on the forehead where the original scar, if present, had better be followed. All scar tissue should be excised, if possible, as stitches will have a very insecure hold if placed in cicatricial tissue. It is sometimes possible to make an incision along the hair-line or following the eyebrows and then to uncover the defect by turning the soft tissues down or up as the case may be. The classical horse-shoe shaped flap has not found favour as it encourages the formation of a hæmatoma beneath. Personally we have used this curved incision on several occasions, using silk-worm gut as a drain in one end of the wound for forty-eight hours, and have had no reason to regret it. A crucial incision with its centre over the gap, with excision of all scar, is probably the best. The flaps are carefully raised in the plane of the subaponeurotic layer and if strictly adhered to, it is usually easy to approximate the skin edges afterwards without undue tension, by suitable undercutting.

After the gap has been freely exposed well beyond its margins, all scar tissue must be removed. This must be done with great care and deliberation, otherwise the dura may be unexpectedly opened, the dura indeed may be non-existent, being replaced by a delicate layer of fibrous tissue. The plane of dissection must be parallel to the surface and any rent incidentally made to allow cerebro-spinal fluid to escape, must be carefully sutured with fine cat-gut.

One of the most important steps of the operation now follows: The pericranium is carefully incised all around close to the margin of the opening in the bone, the greatest care being made to

avoid any chance slip of the point of the knife, which might be disastrous. This very narrow strip of pericranium is now carefully elevated and the operator gradually works the instrument around the edge of the hole, aided by slight nicks with the point of a knife, until the elevator can be freely passed under the skull completely around between the dura and the bone. This step is absolutely essential on account of the danger of leaving behind projecting spicules of bone irritating to the brain.

No attempt to remove the island of granulation tissue in the centre should be made or troublesome oozing is likely to occur. This boss of tissue will do no harm, but on the contrary, will help to support the graft. No apprehension need be felt that the leaving of this central material will give rise to pressure, in fact, those cases showing a slight protuberance after operation give finally the best results, as some recession of the graft is sure to take place later.

All bony spicules and irregularities of the margin of the opening must next be removed by a rongeur or suitable instrument. The writer is in the habit of making the aperture as regular in contour as possible, facilitating the accurate fitting of the graft.

One-half or more of the outer thickness of the bone is next cut away so that a gutter is left all around the margin of the opening. This may be done with an electric burr, but we find a gouge and mallet more easily manipulated and a groove may be as quickly cut as with the electrically-driven instrument and without the objection of overheating, the leaving behind of bone dust or the danger of the instrument's slipping.

The length and breadth of the hiatus are next ascertained and two probes are bent to mark these measurements. The whole area is now covered with hot moist compresses while the cartilage grafts are being cut.

These transplants are cut from one-half the thickness of the sixth, seventh and eighth costal cartilages, preferably from the same side as the head wound. The best incision is a vertical one, two finger-breadths outside the sternal border and splitting the fibres of the rectus abdominis muscle. The cartilages of the ninth and tenth ribs are too thin and narrow to be of much use.

Special knives were devised by Villandre having shanks set at an angle, bayonet-wise, to facilitate cutting parallel to the surface at the bottom of a fairly deep wound. Personally we have found a knife of this pattern very difficult to manipulate

with firmness and precision and, therefore, prefer a very short-bladed scalpel with a keen edge. In removing cartilage first plot and mark out a block sufficiently large, if possible, to cover the whole bony defect in one piece, using the bent probes before mentioned as a gauge, then with the scalpel make a cut perpendicular to the surface for one-half the thickness of the cartilage. The blade of the knife is next sunk in for its full depth at the lower edge of the area outlined and at a depth equal to one-half the thickness of the cartilage and a transverse cut is made which raises a slip from the lower part. This strip may now be lightly seized with a dressing forceps and rolled slightly upwards, exposing the situation of the next slicing cut. This is continued until the removal of the graft is completed, when it is transferred to a saline solution.

When about to do a cranioplasty we have at times attempted to procure a suitably-shaped portion of the vault of the cranium of a new-born dead baby but were never successful in finding any such material when most wanted. Cranial pieces of this sort could easily be used as a graft, for it could be procured of any size and shape and in any amount, and two superimposed layers might be utilized if necessary. The cartilage graft always curls somewhat, bringing the perichondrium into the concavity.

While the operator is placing the graft in the skull, much time will be saved if an assistant closes the thoracic wound in layers.

The graft is now accurately trimmed into shape with scissors and with the perichondrium-covered-side down, is fitted into the defect of the skull with its edges lying in the bony groove around the margin of the hole.

The graft is next sewn all around to the cut edge of the surrounding pericranium, with interrupted cat-gut sutures or, as has seemed better to the writer, has been attached by four widely separated sutures and by the using of a zig-zag suture back and forth across the face of the graft, catching the edge of the cut pericranium on each side in the stitch. The graft is thus effectually and firmly fixed in position in much less time than is usually consumed.

The scalp is accurately sutured and a drain of several strands of silk-worm gut placed in one angle of the wound for forty-eight hours.

The after treatment consists largely of morphia to control the pain always present, in the thoracic wound. It is advisable to prop the patient up in a semi-recumbent posture. The

stitches may be removed in ten days and the patient allowed to be up out of bed.

SUMMARY

The results of cranioplasty in relieving the patient of some or all of the distressing symptoms mentioned in the early part of this paper are excellent. In most instances the patients are cured, or if not, are greatly benefitted. It is not to be expected that this operation will materially improve those cases where brain lesions are present following injury, but it is intended to protect the brain from repeated traumatism on the margins of the bony outlet. In our exper-

ience it requires at least three months before the results of cranio-plasty can be fairly judged.

The writer has operated upon seven cases, four of which have been entirely cured, two much benefitted, and one unimproved. This last case showing no improvement, was one in which the damage was caused by a bullet, there was good reason to believe that the brain was seriously damaged. This might account for the failure to obtain a good result. In all cases the skull is now firm and symmetrical and in two, with frontal bone involvement the cosmetic result is excellent.

It is probable that the cartilage graft never ossifies, but remains firmly attached to the surrounding bone by fibrous tissue.

Retrospect

THE TOXIC ACTION OF ARSPHENAMINE AND NEOARSPHENAMINE

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RECENTLY arsphenamine and its congeners have been the subject of considerable interesting investigation along pharmacological and chemical lines, and particularly on the subject of the toxic reactions which frequently follow their administration. While at times the involved polysyllabic chemical formulæ are apt to be disconcerting to the average reader, these investigations have a decided practical bearing in that they tend to bring about reform and standardization of the methods of administration of compounds, which in the past have often been given with a neglect of essential precautions that is almost criminal. It may, therefore be of interest if a brief review is made of certain papers which have recently appeared.

The great war was responsible for a large number of substitutes for the original German preparations of 606 and 914, which bore the trade names of salvarsan and neosalvarsan. It is highly important that these drugs which are almost uni-

versally given by the intravenous route, which, if the most effective, is not the least hazardous, should be as free from dangerous chemical impurities as possible. Both the British and United States Governments have bureaus which demand certain standards of purity. Their tests are based upon toxicity tests among the lower laboratory animals. At the Hygienic Laboratory of the United States Government in Washington, use is made of white rats. For arsphenamine, it is required that white rats weighing from 100-150 grams shall tolerate 100 mg. of the drug per kg. of body weight for forty-eight hours. The drug is given intravenously in a 2 per cent. alkaline solution in water, 0.9 c.c. of normal sodium hydroxide solution being used for 100 mg. of arsphenamine. For neoarsphenamine, the white rats are required to tolerate 200 mg. per kg. for seven days, the drug being given intravenously in a 4 per cent. aqueous solution. It is further required that for both compounds the rate of injection shall be 12-15 seconds for every 0.1 c.c. of solution.

The British Government requires the tests to be made by the Medical Research Council of the Board of Trade. Here the animals used are albino mice, and 125 mg. per kg. are required to be tolerated.

Schamberg¹ points out that toxicity tests of 606 and 914 among the lower animals possess

definite chemical value, as a means of establishing standards of purity for these compounds. Animal tests show lethal toxicity only, that is, the duration of life after administrations of given amounts per kgm. of body weight. Calculated upon the highest tolerated dose by intravenous injection in healthy rats, and granted the tissues of the human body are of the same susceptibility, the highest tolerated dose of arsphenamine for the average adult weighing 70 kgm. would be 7.55 gm. and for neoarsphenamine 17.5 gm. Probably, however, as rabbits are less susceptible, human beings cannot tolerate these compounds in proportionate doses. As, however, the highest single dose of arsphenamine and neoarsphenamine seldom exceeds 0.6 gm. and 0.9 gm. respectively, the margin of safety is considerable. Neoarsphenamine is about 2.4 times less toxic than arsphenamine.

Roth² in animal toxicity experiments, carried out in the Hygienic Laboratory at Washington, showed that there is a marked difference in the behavior of arsphenamine and neoarsphenamine in the animal organism, and the non-identity of the two compounds must be kept clearly in mind. Several of his conclusions are most important to the physician who uses arsphenamine and neoarsphenamine.

1. Intravenous injections of an acid solution of arsphenamine are much more toxic than the corresponding alkaline solution, the toxicity increasing with the concentration.

2. A properly alkalized 2 per cent. solution of arsphenamine, when given intravenously is slightly more toxic than a $\frac{1}{2}$ per cent. solution.

3. The toxicity of a properly alkalized solution of arsphenamine increases greatly as the rate of its intravenous administration is increased.

4. Shaking aqueous solutions of neoarsphenamine or alkalized arsphenamine in the presence of air markedly increased their toxicity³.

5. When neoarsphenamine dissolves with comparative difficulty it is usually highly toxic and should be discarded.

There is a Chauvinistic touch about his research into the comparative toxicity of United States and foreign (Canadian, French, Japanese and German) products, as a result of which he declares that arsphenamine preparations of United States manufacture are generally less toxic than those of foreign manufacture.

Kolmer and Yagle⁴ have investigated the hæmolytic activity of solutions of arsphenamine and neoarsphenamine. They found that solutions of arsphenamine in isotonic saline are from three to

ten times less hæmolytic than solutions in water, and that concentrated solutions of arsphenamine in water and isotonic saline are more hæmolytic than dilute solutions. The addition of sodium hydroxide to solutions of arsphenamine in water and isotonic saline solutions for purposes of neutralization unavoidably increases their hæmolytic activity, which is further increased by the addition of an excess of the alkali.

The addition of sufficient alkali to the point of clearing causes the formation of the monosodium salt of arsphenamine, which was Ehrlich's original recommendation for administering the drug. The addition of further alkali produces or partially produces the disodium salt, which is generally regarded as less toxic. Whether solutions of disodium salt are less toxic than solutions of the monosodium salt is yet to be conclusively proven. From the standpoint of hæmolysis alone, the addition of just enough alkali to clear is preferable to solutions where one-third excess of alkali is added. Kolmer and Yagle recommend the addition of one-fifth excess of alkali. From the point of view of toxic reaction, the benefit of this procedure has been confirmed in the clinic at the Montreal General Hospital, in a large series of administrations. The reactions were far fewer where this amount of excess of alkali was added, than where only sufficient alkali was added to clear.

These authors point out that owing to the production of sodium chloride when arsphenamine is dissolved in water and neutralized with sodium hydroxide, "in the preparation of isotonic solutions, varying strengths of sodium chloride in distilled water must be used according to the total volume of fluid desired," and that "a salt solution of one uniform strength does not suffice for all concentrations". For the ideal concentration, i.e., a .5 per cent. solution of arsphenamine, a sodium chloride solution of the strength 0.77 per cent. is required to render the resulting solution isotonic.

With neoarsphenamine the case is somewhat different. Dilute solutions of neoarsphenamine, as 0.9 gm. in 90 c.c. of more of water, are hæmolytic, as the solution is hypotonic. Concentrated solutions, as 0.9 gm. in 30 c.c. of less of water, are not hæmolytic, owing to the presence of sufficient inorganic salts from the drug to render the solution approximately isotonic. If dilute solutions of neoarsphenamine are to be given, then sterile physiological saline in freshly distilled water should be used. If concentrated solutions are

given, then sterile distilled water is to be employed.

The administration of intravenous injections slowly rather than quickly, allows an opportunity for the dilution of the hæmolytic solution of arsphenamine with the blood, and therefore reduces its hæmolytic activity.

There would appear to be a sufficient parallelism between the toxicity experiments of other authors and the hæmolytic experiments of Kolmer and Yagle to warrant the procedures outlined being followed in the technique of administering arsphenamine and neoarsphenamine intravenously.

The untoward effects that frequently follow the injection of these arsenical compounds have been the subject of much interesting discussion. There are three clinical types of reaction: (1) immediate, (2) early and (3) delayed. The immediate reactions are the so-called nitritoid crises; the early reactions are febrile and gastro-intestinal; and the delayed reactions are referable to the brain, liver or gastro-intestinal tract.

Hunt⁵ states that the following types of reactions have been observed:

1. The toxicity is due to the "arsenoxid";
2. The toxicity is due to the presence of toxic substances other than the arsenoxid;
3. The toxicity is due to the physical properties of the solution.

Ehrlich was of the opinion that the arsenoxide was responsible. In this respect, Roth³ showed that the toxicity of alkaline solutions of 606 was increased by 60 per cent. after one minute's vigorous shaking in the presence of air. Hunt supports the contention of Roth by showing that such solutions may be rendered non-toxic by means that cause further oxidation, by adding sodium hyposulphite and by continued aeration with warming. He states that no toxic or experimental commercial preparation of arsphenamine was met with, the toxicity of which could be attributed to the oxide.

Schamberg⁸ is of the opinion that the immediate vasoparetic symptoms are due to the presence of an unidentified impurity in 606, which he has named substance X.

This view is not universally accepted, however. For instance, the British Salvarsan Committee states that "there is no evidence to justify the conclusion that ordinary variations of toxicity, apart from those due to exposure of the substance to air, are due to the presence of impurities more toxic than arsphenamine itself.

Danysz⁸ attributes many of the reactions of arsphenamine to the intravascular precipitation

of the latter by certain inorganic constituents of the blood. This may be true of acid solutions of arsphenamine, and probably also concentrated solutions of monosodium arsphenamine, but there is no adequate evidence that precipitation occurs after the use of disodium arsphenamine, and none at all that neoarsphenamine is ever precipitated in the blood. The injection of acid solutions of arsphenamine is prone to produce death, and if less concentrated, may lead to the development of a broncho-pneumonia, as a result of intravascular precipitation of the drug. Concentrated solutions of the monosodium salt may act similarly. This chain of events has not been noted after the injection of disodium arsphenamine solution, or of neoarsphenamine, but cloudy neoarsphenamine solutions are likely to produce severe nitritoid symptoms. As neoarsphenamine does not cause intravascular precipitation, there is introduced here an element of confusion and the cause remains to be elucidated.

Schamberg and his co-workers believe that if arsphenamine is properly neutralized, and the disodium salt and not the monosodium variety is injected, intravascular precipitation does not take place. Certainly it does not occur *in vitro*.

Smith⁶ has studied the rise in the pulmonary arterial tension after arsphenamine injections. This he finds is due to two factors, first the mechanical blocking of pulmonary arterioles due to intravascular precipitation; second, the vasoconstrictor action of arsphenamine on the pulmonary vessels. Acid solutions of arsphenamine and monosodium arsphenamine will produce mechanical blocking. The minimal effect was produced by the injection of an alkaline solution representing a mixture of the mono and disodium salts, one in which 0.8 c.c. normal sodium hydrate per 100 mgm. of the drug was added. This solution in 0.5 per cent. dilution, and given rather slowly, produced no appreciable effect on the pulmonary pressure. The danger of adding an excess of alkali lies in the augmentation of the vasoconstrictor action of the drug. Smith concludes that the cardiac dilatation following intravenous injection of arsphenamine is not a direct effect of the action of the drug, but is secondary to the pulmonary obstruction.

It is probably true that there is no one cause of reaction. The ætiologic factors are to be found somewhere in the relation between (1) the patient, (2) the drug, and (3) the technique of administration.

What practical conclusions are to be drawn

from all this? Granted that the preparation conforms to Government standards by toxicity tests, the method of preparing the drug for, and the actual technique of intravenous injection are all important. One may therefore lay down the following axioms for arsphenamine and neoarsphenamine, laying stress upon the fact that the solution of the drug for administration involves accurate and important chemical reactions, and that all reagents and apparatus should be chemically pure, and all quantities used scrupulously exact.

1. Glassware and other apparatus used in mixing and injecting should be dry sterilized.

2. Distilled water should be freshly distilled, and the saline solution should be prepared from freshly distilled water.

3. For arsphenamine injections, isotonic saline should be used, the drug being in a concentration of 0.5 per cent. (0.1 gm. dissolved in 20 c.c.). This requires 0.7 per cent. saline solution to render it isotonic. Chemically pure normal sodium hydrate (4 per cent.) should be added slowly from a special burette till the solution clears, and then one-fifth in excess added, and the resulting solution filtered.

4. Solution should not be aided by too vigorous shaking. The mixture should be administered as soon as possible after preparation, and should be

injected rather slowly and through a needle whose calibre is not too large.

5. For neoarsphenamine injection, if concentrated solutions are used (0.1 gm. in 3 c.c.), distilled water should be used. On the other hand, if dilute solutions are used, normal saline solution should be the medium.

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Case Report

FROM THE SURGICAL CLINIC OF
DR. F. N. G. STARR

TORONTO GENERAL HOSPITAL

CASE No. 1. *Cholelithiasis—Acute hemorrhagic pancreatitis—Volvulus of the small intestine.* Female, age fifty-five, widow. Admitted to Ward C., Toronto General Hospital, December 26th, at 11.00 p.m.

Complaint: (1) Abdominal pain in the right upper abdomen. (2) Vomiting for four days. (3) Inability to take food for six days.

History of the previous condition. Fifteen years ago she fell down stairs, and was confined to bed

for two weeks. Shortly after this fall she began to suffer from what she termed "indigestion", associated with pain in the epigastrium, coming on about twenty minutes after meals. The pain was relieved by drinking warm water. Constipation dated from this time, and ever since frequent cathartics have been necessary. It was not unusual for several days to elapse without a bowel movement. Ten years ago there was a very severe attack of pain confined to the left hypochondrium. This attack lasted for about twenty-four hours, and was followed by nausea. There have been, subsequently, three or four similar attacks of abdominal pain, coming at long intervals, radiating from the left upper abdomen. The attack immediately preceding the present one occurred in

December, 1920, and started at 3 a.m., waking the patient out of her sleep. This pain was so severe that on attempting to get out of bed she was unable to move, and could only cry for help. There was no pain in the right upper abdomen at this time, the area of maximum pain being in the left hypochondrium. It was constant while it lasted, felt like something grasping the bowel, and left an area of soreness. It did not cease suddenly, but wore off gradually. For the past few months she has had a bloated feeling in the epigastrium, coming on at intervals, with a definite distaste for food, but no actual pain. However, there has been on several occasions a heavy, loaded feeling in the left upper abdomen.

Family History.—Has no bearing on the present attack.

Date and Mode of Onset of the present attack. While scrubbing a floor on December 23rd, 1920, she became suddenly nauseated and vomited her breakfast. Shortly afterwards she vomited several pints of a greenish fluid. This was followed by extreme weakness and profuse cold perspiration. She went to bed, suffering severely from an aching, continuous pain in the left upper abdomen. This severe pain continued without any remission to the time of her admission. It was made markedly worse by moving about in bed. There was a persistence of the nausea and vomiting from the onset until admission, and for the previous forty-eight hours she had been unable to secure a bowel movement.

Condition on Admission. Patient appeared to be very ill, thin, under-nourished, with sallow, white skin; the respiratory system showed nothing abnormal; the cardio-vascular system showed nothing abnormal; her blood pressure was, systolic, 110; diastolic, 82; the nervous system showed nothing abnormal;—urinalysis showed acid urine, specific gravity of 1020, trace of albumen, no sugar; a large number of epithelial cells and a few pus cells were found microscopically.

Abdominal Examination. The abdomen was markedly distended, but moved freely with respiration. The left upper abdomen was more prominent than the right. On palpation, no muscular rigidity was present, the muscles being flaccid. There was marked tenderness in the epigastrium and along the lateral border of the left rectus, where a coil of distended bowel could be palpated. The whole abdomen was tympanitic on percussion, most marked in the left upper quadrant. The white blood count was 22,800.

Diagnosis. Intestinal obstruction. Immediate operation advised.

Operation. September 27th, 12.30 a.m. On abdominal palpation, with the patient under ether anaesthesia, a mass was felt in the left upper abdomen which was taken for an enlarged pancreas. An incision was made through the left upper rectus, and the peritoneal cavity explored. On opening this cavity, a certain amount of blood-coloured fluid escaped, and one was impressed by the numerous areas of fat necrosis scattered throughout the omentum and the mesentery of the small bowel. The whole extent of the small intestine was very red and oedematous. There was a segment, roughly six feet in length, which was more oedematous than the other coils, and in some areas there were large, sub-peritoneal hæmorrhages. On exploring the mesentery of the small bowel, one found that there had been a complete torsion of this structure with volvulus of the small bowel. Near the root of the mesentery was a large area of fat necrosis, measuring roughly one inch and a half by one inch. This was not disturbed, for fear of wounding one of the large mesenteric veins. The pancreas was found to be enormously enlarged and a number of hæmorrhages were scattered throughout its entirety. The gall bladder was enlarged and contained many stones. The common duct, however, contained no stones, and none was found in the ampulla of Vater. The mesentery of the small intestine was untwisted in such a manner as to undo the torsion which had taken place, and the color of the small bowel immediately began to improve. A stab wound was made under the right costal margin, and the gall bladder delivered through this opening. The mid-line incision was then closed. The gall bladder was opened, stones evacuated, and a tube sewn to the opening in the fundus to allow free exit of bile. During the operation forty ounces of saline were given interstitially into the axillary fossæ. On completion of the operation, gastric lavage was done, and a large volume of very foul-smelling gastric contents removed.

Progress Notes. At 5.30 a.m. on the morning of the operation, one c.c. of pituitrin was given hypodermically, followed by a 1-2-3 enema, which resulted in a very satisfactory bowel movement, and the passage of a large amount of flatus. There was considerable shock following the operation, which was combatted by rectal instillation of two drachms of concentrated tincture of digitalis (B. & W.) given in a solution of normal saline

containing ten per cent. glucose and five per cent. soda bicarbonate, by means of the Murphy drip method. The gall bladder drained very well, five ounces being collected in the first twenty-four hours after the operation. The subsequent drainage varied from eight to fourteen ounces, until the tube was removed on the 7th of January, 1921. On the 28th of January the pulse began to increase in rate and diminish in volume. An intravenous injection of 600 c.c. of ten per cent. glucose was given, with a markedly beneficial effect. The mid-line incision healed by primary union. The tube was removed from the gall bladder on the 7th of January, and a slight amount of clear normal-coloured bile drained from the fistula. The patient's general condition was excellent; temperature was normal.

January 25th, 1921. The patient was feeling very well, and suffering from no abdominal discomfort. The feeling of heaviness which had persisted for some months previous to operation appeared to have been relieved. The skin was clear, the sallow colour which had been present previous to operation having disappeared. The bile coming from the fistula was daily decreasing in amount, and was of normal appearance.

Comment. (Dr. Roscoe R. Graham.) Acute hæmorrhagic pancreatitis is not very common. A volvulus involving the whole of the small intestine is still more rare, and to have the two conditions appearing simultaneously in the same patient is indeed a most unique experience. In this instance, cholelithiasis was associated with the pancreatic lesion. In a former communication we have pointed out the relationship between gall bladder disease and pancreatic lesions, particularly of the acute hæmorrhagic variety. From the history it would appear that this is not the first attack of pancreatitis from which this patient has suffered. There had been four or five previous attacks of pain, which, according to the patient's story, appeared to be of a very similar character to that from which she suffered at the beginning of the present attack. One must not lose sight therefore, of the fact that acute hæmorrhagic pancreatitis is not necessarily a progressive lesion, and that without operation the patient may recover. It is also interesting to note in this particular instance that there was no local direct operative attack on the pancreas. In fact, the lesser sac of peritoneum was not even opened. The whole condition appeared to have been dependent upon a primary gall bladder pathology, and dealing with this lesion even in the

most simple manner, by removal of the stones and drainage of the biliary tract through the gall bladder, was sufficient to bring about a most successful issue. In the past, one has been led to believe that it was necessary to make a very direct attack on the pancreas; in fact, many observers have advised that in all cases one should open widely the hæmorrhagic area of the pancreas, pack in strip gauze, and place a tube in the lesser sac of peritoneum. This instance would seem to prove that the more simple procedure of gall bladder drainage after removal of the stones will accomplish quite as much as the more formidable and time-consuming procedure. One need not, in fact, remove the gall bladder, which consideration, in patients who are so extremely ill, is a decided asset, as even the slightest amount of unnecessary trauma should be avoided. The sequence of events in this particular instance seems to be that the patient suffered from a gall bladder lesion. As a result of her fall fifteen years previously this became acute. We have come to believe, however, that gall bladder disease starts much earlier in life than this would indicate. The patient at the time of her fall was forty years of age, and we believe that the fall of itself would not be sufficient to produce a gross biliary lesion. On enquiring into the past history of a large number of patients suffering from gall bladder disease, we have found that their early life has been associated with so-called bilious attacks, sick headaches, and various types of chronic gastro-intestinal disturbances. In this particular instance, following the disease in the gall bladder, we have the pancreatic affection of chronic fibrotic type, extending over a long period of years, with four or five definitely acute attacks, probably of the hæmorrhagic type, culminating in the present attack of a very severe, acute hæmorrhagic pancreatitis, and following this condition we have superadded a volvulus involving the whole of the small intestine. It is difficult to explain the occurrence of a volvulus of the small intestine with so marked an embarrassment of the circulation in such a definite segment, while the whole of the small intestines were red and cedematous. This cannot be done with any degree of certainty, but the explanation appears to rest in the fact that on the root of the mesentery was found the enormous area of fat necrosis, which would interfere very materially with the blood supply to the segment, which appeared so cyanotic, and which contained so many petechial hæmorrhages. This area of fat necrosis, besides interfering with the blood supply

of the loop of bowel, would also interfere with the motor nerve supply, and decrease peristaltic activity, while active peristalsis in the bowel proximal to this area would tend to increase the rotation of the bowel and mesentery.

In view of the operative findings, there are several points in the pre-operative investigation and history which are of interest. This patient was seized with sudden acute upper abdominal pain, and at the time of her admittance there was evidence of free fluid in the peritoneal cavity, associated with a very high leucocyte count. In addition there was a history of previous gastrointestinal disturbance over a very long period of time. One would immediately think of a perforated gastric ulcer. However, the liver dullness was not markedly diminished, and the point of maximum pain and tenderness, which we believe to be of such extreme importance in the diagnosis of acute abdominal disease, was situated to the left of the middle line under the left costal arch, radiating down the lateral border of the left rectus. This situation of the pain, and an absence of rigidity in the abdominal muscles, appeared to be sufficient evidence to rule out a perforated gastric ulcer. The flaccid abdominal muscles would not be present if the patient were suffering from a peritonitis of an infective origin, but flaccidity is constantly found in acute pancreatitis. The sudden onset of the pain, of such a severe type, persisting without remission in the presence of flaccid recti muscles, and associated with persistent vomiting, should have put one on guard sufficiently to have made a pre-operative diagnosis of pancreatitis. It is true that this was suspected, and a mass was palpated after the patient was under the anæsthetic, and before the peritoneal cavity was opened. However, in this instance, as a result of the volvulus, we have superadded intestinal obstruction, which was evident from the severe abdominal distension and intractable vomiting. This diagnosis was correct as far as it went, but in the analysis of the previous history, type of onset and physical findings, one had in addition a very good clinical picture of a case of acute hæmorrhagic pancreatitis.

CONCLUSIONS

1. Acute hæmorrhagic pancreatitis is always secondary to disease of the biliary tract, and in the large majority of cases is associated with stones in the gall bladder, but not necessarily in the common duct or in the ampulla of Vater.

2. Acute hæmorrhagic pancreatitis is not a progressive disease, and may recover without operative interference.

3. The determination of the point of maximum pain and tenderness in acute abdominal conditions is a most important part of the pre-operative physical examination and will often lead to an accurate diagnosis of the site of the lesion.

4. Rigidity of the abdominal muscles is absent in acute lesions of the pancreas. *Abdominal palpation, with the patient under an anæsthetic, before the abdomen is opened, will often reveal a mass or an indefinite resistance which could not be palpated before, thus giving a clue to the site of an obscure lesion, and making for more satisfactory results and greater ease in operating.* In this instance, with the diagnosis of intestinal obstruction, had one not made a careful abdominal palpation under anæsthesia, the abdomen would undoubtedly have been opened in the lower segment, near the middle line, because, taking into consideration the patient's age, the most likely cause of acute intestinal obstruction would have been a malignant growth in the large bowel, or bands of adhesion which could have been effectively dealt with through an incision in this area.

5. To secure a successful result in an acute hæmorrhagic lesion of the pancreas, the most simple procedure seems to be efficacious. It is not essential in all cases to make a direct attack on the pancreas itself, nor is it absolutely essential to always drain the lesser sac. Opening the gall bladder, removing the stones, and inserting a tube in the gall bladder for drainage, seems to be the one essential procedure.

CASE NO. 2. *Perforated gastric ulcer—closure and posterior gastro enterostomy.* Age forty-two, housewife, admitted to Ward C, Toronto General Hospital, December 18th, 1920. Referred by Dr. J. H. Woods.

Complaint. Sudden severe, epigastric pain.

Family History. Father died of gastric cancer; otherwise negative.

Past Illnesses and Previous Condition. Patient had diseases of childhood, but no other severe infections or illnesses. She has born five children, one living and well; the other four died in infancy. She was perfectly healthy till eighteen years of age, when she began to suffer from what she terms "indigestion". This was characterized by epigastric and retro-sternal pain, coming on two to three hours after meals. This pain radiated

through to the back between the shoulder blades. These attacks came on at intervals of from one to two years, and would last for three to four months. Vomiting occurred occasionally, and when it occurred would relieve the pain. The patient volunteered that the vomitus didn't appear acid. Since the onset of this disability she has been continuously constipated.

Three years ago the character of the attacks appeared to have changed. The intervals became much shorter, and the attacks themselves did not last so long. Since this time there has been no definite pain, but more a feeling of distress and fulness in the upper abdomen, associated with nausea and vomiting, which always gives temporary relief. There has been much belching of very foul-smelling gas. For the last year the patient has noticed a constant painful area in the upper abdomen two inches below the sternum. In July, 1920, she noticed that she was losing weight. For the last six weeks the distress had been steadily increasing. In the afternoon of each day she began to feel bloated, and by nine or ten o'clock in the evening became so distressed that she would vomit. This always gave relief. The vomitus contained particles of foul-smelling undigested food. At no time had she noticed any blood in the vomitus. She had, however, noticed that on several occasions the stools were almost black. There was marked pyrosis for two or three hours after the evening vomiting. This was very sour, and caused a burning sensation in the pharynx.

Date and Mode of Onset of Present Attack. On the night of December 15th, 1920, she was unable to sleep because of a burning in the epigastrium. December 17th, 1920, there was a sensation as if "stomach were being drawn up in a knot," associated with very severe lumbar pain and nausea. At 4 a.m. on the morning of December 18th, 1920, the patient was awakened with a sudden severe pain in the umbilical region, to the right of the mid-line, radiating to the right scapula. At 5 a.m. there was an attack of severe vomiting associated with an extreme degree of shock. She was seen at 2.30 p.m. and admitted to hospital at 4.30 p.m.

Condition on Admission. Patient appeared extremely ill, was very pale, with the exception of a malar flush. The respiratory, nervous, cardiovascular and genito-urinary systems showed no evidence of organic change. There was one lymphatic gland in the left axilla enlarged to about three-quarters of an inch in diameter.

Urinalysis was negative. White blood cells, 22,800; pulse, 100.

Abdominal Examination. There was very slight abdominal distention, but a very definite tenderness and diffuse rigidity over all the abdominal muscles. The point of maximum tenderness was situated to the right of the mid-line, two and a half inches above the level of the umbilicus. There was free fluid in the peritoneal cavity.

Diagnosis. Ruptured gastric or duodenal ulcer. Immediate operation advised.

Operation. 5.00 p. m. Forty ounces of normal saline were given interstitially into the axillary fossæ during the operation. The upper abdomen was opened by a near mid-line incision and a considerable quantity of cloudy fluid escaped. There were particles of fibrin scattered throughout the peritoneal cavity. The appendix was explored, showed evidence of former disease, and was removed. The stomach which was enormously distended, was palpated and no ulcer was felt. On the anterior surface of the first part of the duodenum was found a perforated ulcer, the aperture of which would admit a lead pencil. Around this perforation was an excessive amount of scar tissue, and there was a high degree of pyloric stenosis. A section was removed for histological diagnosis. After thorough cautery excision of the ulcer, the opening was closed by two rows of Lembert sutures, and reinforced by a free omental graft. A swab was made from the peritoneal content for culture. When the opening was closed it was found that there was practically complete pyloric occlusion. One was thus forced to do a posterior gastro-enterostomy, despite the wide-spread reaction within the peritoneal cavity. This was done, after bringing a large area of the posterior wall of the stomach through the posterior layer of the lesser sac, and fixing it in that position. The abdomen was closed in layers, and a drainage tube inserted to the site of the perforation.

Subsequent History. The condition of the patient following the operation was extremely satisfactory, the temperature rising on one occasion only to 100.4°. The pulse rate remained over 115 for forty-eight hours, after which it gradually returned to normal.

Cultures B-4001, made from the swab taken from the peritoneal contents, were sterile in seventy-two hours in glucose broth and blood agar. The drainage tube was removed in twenty-four hours; no drainage occurred at any time, the wound healing by primary union. The histologi-

cal report S-2453, concerning the section of the ulcer, showed evidence of extreme fibrosis, and an acute inflammatory reaction, but no evidence of malignancy.

The recovery has been most satisfactory, and on discharge, January 12th, 1920, patient appeared to have complete relief from gastric symptoms.

Comment. (Dr. Roscoe R. Graham.) There are several points in this history which are of great interest. In the first place, there was a definite history of gastro-intestinal disorder for twenty-four years—since eighteen years of age. Many individuals past forty years of age have been observed suffering from chronic abdominal disease, from these could be elicited a discontinuous history of their disability, which began prior to their twentieth birthday. This would indicate that during the stage of vigorous early adult life, the body can make compensation for disabilities which, when associated with the inevitable degenerations found later in life, compels it to seek medical or surgical aid. In this instance there was a discontinuous history of a gastric disability, existing practically unchanged for twenty-one years. The last three years of the disease had, however, been characterized by definitely increasing symptoms. In the first period of twenty-one years, vomiting was not a marked factor, but occurred only occasionally. The pain was of a dull, aching type, and caused by the stimulus of the ulcer through the sympathetic nerves. However, during the last three years the intervals between the attacks had become shorter, and the attacks had not lasted so long, but were always accompanied by severe nausea and vomiting, which constantly gave temporary relief.

This leads one to believe that the cause of the exacerbations was an inflammatory reaction at the site of the ulcer. The reason for the attacks occurring more frequently, and lasting for shorter periods, can be sought for in the degree of obstruction which was constantly present as a result of the large amount of fibrous tissue proliferation. Thus around the ulcer, a much less severe inflammatory change would cause a degree of obstruction which would result in nausea and vomiting. This, in turn, would necessitate abstinence from food—and a rapid subsidence of the inflammatory reaction in this area, with a consequent relief of the obstruction.

The symptoms during the last year have differed from those of the two preceding. There was a constant painful area in the epigastrium,

just below the sternum. This was interpreted as peritoneal irritation, the result of ulceration, with destruction of all the muscle layers, leaving only the peritoneal coat to prevent a complete perforation. This activity at the site of the ulcer stimulated a further increase in the proliferation of the connective tissue, causing a progressive pyloric stenosis, which was evidenced by marked loss of weight in July of 1920.

During the six weeks preceding operation there developed a rapidly progressive, pyloric obstruction, characterized by pain occurring constantly in the afternoon, and followed and relieved by vomiting at night, the vomitus showed that very little was leaving the stomach, as it contained much foul-smelling and undigested food.

With such a preceding history, it was only logical to expect an acute perforation. The important point to remember in the diagnosis of acute perforations is that after the initial shock subsides, the patient may be fairly comfortable, with a slow pulse rate and normal temperature, but the muscular rigidity will be persistent. The value of the absence of liver dulness as a sign of perforation is of doubtful value, as it is very often absent, and would thus be misleading. The presence of free fluid is of very real value. As to its source, there is room for discussion. Personally, we feel that most of it is inflammatory exudate, rather than contents of the stomach or duodenum, the exudate being the result of a chemical, rather than a bacterial irritation of the intra-peritoneal contents. That this hypothesis is correct is borne out by the fact that in this instance when operation was performed thirteen hours after perforation of the ulcer, the culture of the peritoneal exudate was sterile. However, if this irritation persists long enough, there results an inflammatory reaction of the large bowel, of sufficient severity to allow colon bacilli to leave the lumen through the wall, with the exudate, and this results in a severe general bacterial peritonitis, with the colon bacillus as the ætiological factor.

This conception of the pathology was of extreme practical importance in this case. When the perforation was closed, the pylorus was occluded. If we felt the exudate was bacterial, we would not have done a posterior gastroenterostomy, but would have done a jejunostomy until the acute lesion subsided, and then at this later date would have performed an anastomosis between stomach and jejunum. Such a procedure compares very unfavourably with the one adopted. This also

emphasizes the needlessness of multiple drains, when the operation is done prior to the development of a peritonitis due to the colon bacillus.

That the histological report shows no evidence of malignancy is quite in accord with the fact that primary duodenal carcinoma is an extremely rare disease.

CONCLUSIONS

1. The free intra-peritoneal fluid found after perforation of gastric or duodenal ulcers is largely inflammatory in origin, rather than coming from the lumen of the stomach or duodenum.

2. This fluid is sterile until infected with colon bacilli, and does not become infected for some hours after perforation, as in this instance it was sterile thirteen hours after the occurrence of the perforation.

3. Following the initial shock of the perforation, all the symptoms and signs of a severe intra-abdominal lesion may be absent for some hours, with the exception of muscular rigidity and localized tenderness on palpation.

4. Drainage can be eliminated in operations done before the onset of a bacillus coli peritonitis, only rarely present within six hours of the occurrence of the perforation.

5. Gastro-enterostomy should be done if possible at the time the perforation is sutured, provided the patient's condition warrants it.

6. A large area of stomach should be delivered through the posterior layer of the lesser peritoneal sac, and sutured to it, before doing a posterior gastro-enterostomy, in individuals with dilated atonic stomachs resulting from a high degree of pyloric obstruction. This avoids disaster when the stomach returns to its normal size.

Editorial

THE REORGANIZATION OF THE CANADIAN MEDICAL ASSOCIATION

JUDGING from the universal appreciation expressed at the Halifax meeting, the enlargement of our Journal has evidently been gratifying to our readers, and now in view of the abundant material for publication, we are promising a still further increase in its size and are looking for much greater scope in our work.

With a view to placing the Association on a broader foundation, and one that will be national in its sphere of influence, the Association has accepted the suggestions of its Executive Committee and plans for extension and reorganization have been adopted.

The first great step in this movement has already been taken by the creation of one Canadian Medical journal in which every Province is co-operating, and for which we expect the whole Canadian profession to lend its unstinted aid.

The time has arrived when the second move can now more easily be taken, and the Association engaged on a campaign of much wider scope.

The Association may and should render valuable service to the state, to the profession and to the individual by undertaking to guide aright both the State and the individual in matters medical. Before this can be attained a better organization is essential and it is for this reason that at the recent meeting at Halifax two important steps were taken:—

First, the creation of a bonded endowment fund, to which every member of the profession is invited to subscribe, each bond to be valued at \$100. and yielding 5 per cent. interest.

Second, the increase in the annual dues of the Association from five to ten dollars. Without this increase the Journal cannot maintain a satisfactory standard, nor, indeed, can it possibly live in its present form. For many years in the past, the members of the profession in Montreal, have personally assumed this financial responsibility, but the time has now come for the whole profession to give its help, and thus secure the permanency of a national medical journal.

Furthermore, a full-time and well-paid secretary will be appointed just as soon as funds are available, while in order to ensure promptness in the plans of re-organization, our Associate Secretary has already been instructed to visit some of the Provincial medical associations for the purpose of carrying on the propaganda of the parent organization.

It will be the policy of the reorganized Medical Association to aid in the progress of things medical, both for the legislatures, for the profession, and for the people, and it is the duty of our Journal to carry out this programme in every legitimate way that is possible.

SUGGESTED REFORMS IN THE CANADIAN MEDICAL ASSOCIATION

QUITE apparent at the Halifax meetings was a healthy spirit of discontent, a discontent that is insistently calling for a proper analysis of conditions as they now are, but which at the same time gives one the hope that the physicians of the Dominion may yet see what they are beginning to demand—a great national association, well organized in itself, and in touch with national questions and conditions.

The committee on reorganization, the editorial boards, the executive and the members at large, while holding many and various views on different questions, are agreed that upon three points immediate action must be taken if the association is to pretend to exist as an active organization.

These points are:

1. The proper use of the Journal columns for the furthering of the Association's needs.
2. An immediate enlargement of the Journal.
3. The appointment of a whole time salaried secretary.

It was asserted in the general session that as yet in the re-dressed, re-arranged journal, no word of a progressive policy, helpful to the association has been seen, the profession very rightly feel that the journal of the association exists primarily for this purpose and insist that without a foundation of policy, organization, and consolidation, no journal of a national association can be said to be fulfilling its purpose.

It was further stated that an enlargement of the journal was an urgent

need if the provinces are to have room. This brought to light again the fact that a debt of several thousand dollars is still being carried, a debt which hampers all effort at readjustment or expansion. **On the lifting of this load may be said to depend the continued existence of the journal.**

For the settling of this matter, and for the arranging of the detail of the third point—the salary of the whole time secretary—a fund must be raised, and the profession, if concerned as to the future of their association and its publication, will in their turn listen to an appeal, an appeal, urgent no doubt but one intimately connected with their interests.

Two plans were suggested and will be acted upon.

1. The raising of the annual dues.
2. The issuing of the Canadian Medical association of \$100.00 bonds or shares bearing interest at 5 per cent.

The first plan affects one and every member of the Canadian Medical Association and we ask them to consider for a moment, that, as compared with other national organizations our membership is small and advertising possibilities few.

The second plan, formulated in executive session, at which nearly \$2,000.00 was subscribed, calls for the issuing of \$100.00 bonds or shares paying 5 per cent.

If the Canadian Medical Association is to exist as a real organization, capable of carrying out a broad policy and exerting a nation wide influence, it must have the appro-

priate machinery, the motive power of which machinery can never be anything else than a properly paid whole time secretary working with the aid of the journal columns.

To place the Canadian Medical Association where it belongs, in the van with the other national associations, a real re-organization is thus being urged. This re-organization must include provision for a salaried official

and an enlarged journal with a broadened policy; support should not be asked for any plan lacking in these essentials of business management, and we are begging the profession to look kindly on the question of raising the dues and to encourage the bond issue only because we feel that the plans suggested look like a rational way of meeting a serious problem.

O. E. B.

THE VALUE OF RURAL MEDICAL CENTRES

THE value of rural medical centres equipped with means for carrying out all the more important diagnostic measures which may be demanded nowadays by physicians, has been placed before the profession by Dr. Victor C. Vaughan of the University of Michigan in a paper read at the annual congress on medical education held recently in Chicago.

At the beginning of his address, Dr. Vaughan called attention to the number of valuable contributions to scientific medicine, which had been made during the earlier half of the 19th century by rural practitioners. In illustration he mentioned among others the well-known work of William Beaumont on the stomach carried out on the island of Mackinac and the surgical advances made by Ephraim McDowell with his first ovariectomy, and Marion Sims devising the first successful treatment of a vesicovaginal fistula. In those days the armamentarium of the physician was simple and easily obtained; medical books were rare; but scattered through the profession in rural as well as in urban districts were well educated

men, trained to be careful observers as well as clear thinkers. During the past fifty years these conditions have been gradually altering. For advanced work and research of all kinds, an expensive laboratory with specially trained workers is a necessity, and the physician who desires to do scientific work of a high character must remain in a medical centre where such facilities can be obtained. The country physician falls behind his city brother for lack of such opportunities. The result is shown in a lessening death rate for large cities, but an increasing rate for rural districts. In 1900 the annual death rate in cities in which exact statistics are available was 17.4 per cent.; while in rural districts under similar conditions the death rate was only 14.1 per cent. In 1917 the death rate in cities had fallen 2.3 per thousand, while the death rate in rural districts had increased 0.6 per thousand. Dr. Vaughan states that these figures are conservative, and that more telling figures could be presented were he to deal with the mortality rates of some specific diseases. He considers that there is ample justification for

both the country practitioner and his patients to demand improved facilities to be supplied by the State to enable him to carry out work of a high character. This can be done best by the establishment of rural medical centres. Such medical centres should be equipped with every scientific facility to enable every legally qualified physician, whether in the city or in the country, to carry out all diagnostic procedures necessary for a correct determination of the causes of disease, and to assist in the treatment. Associated with such a laboratory there should be a well selected library and the more important current journals. To supply these needs which are out of the reach of the rural practitioner, a community, the boundaries of which may or may not be determined on country or municipal lines, should have the authority on a majority vote of its citizens to equip and maintain such a medical centre

with or without hospital privileges in which every physician in the community can have all facilities necessary for the elucidation and study of the diseases he may meet with. Such a medical centre should contain the more important medical journals, and be able to obtain the loan from some large library of any book or journal which might be desired. If in association with a hospital, such a medical centre could serve as a graduate school, and scientists and specialists could be called to its wards and laboratories to give instruction in any new advance. Such a hospital would enable any rural community to carry on, not only valuable scientific observation on many phases of disease, but once more place the rural physician in a position to make definite additions to our knowledge, and give him an equal chance with his urban confrere to grow in knowledge and skill.

Abstracts from Current Literature

SURGICAL THERAPEUTICS

Acidosis in Operative Surgery. Farrar, Lillian. *Surg. Gynec. and Obst.*, April 1921, Vol. 32, P. 328.

Recently an attempt has been made to use the theory of acidosis as an indicator of impending shock during operation. By acidosis is meant a general impoverishment of the body bases, so that the body as a whole shows some systemic abnormality. Carbohydrates are the main base forming foods. Fats may also be counted on, but only in the presence of carbohydrates. In proteins are found the acid forming foods.

It has been found that the bicarbonates of the blood are the carriers of the acid products to the lungs and are the main factor in

maintaining the acid base balance of the body. During operation the alkali reserve is usually reduced, and if sufficiently so, will ultimately result in acidosis with its associated condition shock. This state is more common in women because the range between the normal limits of the combining power of the blood for carbon dioxide is much shorter than in men.

In order to offset the condition, 20 per cent. glucose solution has been administered intravenously with very encouraging results. Glucose has many advantages over other solutions used for the same purpose. For a patient weighing 150 lbs. 260 Cu. Centimeters are given per hour during the operation. Glucose is also used in the cases of extreme vomiting found either after operation or in pregnancy with very beneficial results.

As it had been found that the fall in blood pressure bears a close relation to the fall in the alkali reserve, attempts were made to discover some material which would maintain the pressure without the necessity of too large a volume. A colloid was found which proved of some value. Gum Acacia in 6 per cent. solution was added to the 20 per cent. glucose solution.

Carbohydrate feeding before and after the operation, together with the use of bicarbonate of soda will do much to lessen the risk of acidosis.

G. A. F.

ANAESTHESIA

The Cause of Death from Nitrous Oxide—Oxygen Anaesthesia. Baldwin, J. F. *Med. Rec.*, Feb. 12th, 1921, P. 266-267.

Attention is drawn to the frequency of death under nitrous oxide and oxygen. In Columbus, Ohio, the writer states, the mortality in administrations for major anaesthesia was one per cent.

Dr. Dennis E. Jackson (Professor of Pharmacology in Washington University Medical School) is quoted as stating that any direct action on the heart during gas and oxygen anaesthesia is due to lack of oxygen and hampered excretion of CO₂. The principal effect is probably stimulation of the cardio-inhibitory centre in the medulla. Ventricular fibrillation, due to vagus stimulation, may be the cause of death, after the manner which Levy has described for chloroform.

Another factor may be central respiratory depression, due to the depressing effect of the gas, coupled with excess of carbon dioxide and lack of oxygen.

He doubts the possibility of death under gas anaesthesia without the element of asphyxia.

W. B. H.

Blood Pressure Guides during Anaesthesia and Operation. Miller, Albert H. *Am. J. Surg.*, April 1921, P. 34.

Miller states that the avoidance of the condition known as shock depends largely on the presence of favourable factors in the sur-

roundings of the patient during operation. Among these are smooth light anaesthesia, suitable temperature and proper position with the avoidance of anything which may tend to hamper respiration.

The blood pressure in stout patients, especially those with damaged hearts, is easily affected by changes in posture. If the respiration is obstructed the systolic pressure is increased, sometimes as much as 50 mm, with little change in the diastolic. If the obstruction persists there is a steady fall in both systolic and diastolic pressures.

Too low a temperature in the operating room with exposure of viscera is associated with a rapid fall of blood pressure. A drop, usually but not always transient, is associated with the application of heat or cold to extensive visceral or muscular surfaces or with irrigation of the body cavities with hot solutions.

A considerable drop of blood pressure sometimes follows a change to the Trendelenburg position. In one of the writer's cases a patient who had undergone amputation of the breast was propped up into the sitting position and immediately died. As a result of the administration of the anaesthetic there is frequently a preliminary rise sometimes as much as 30 mm. Within twenty minutes it has gone back to the usual level.

Profound anaesthesia is accompanied by a marked decline affecting systolic, diastolic and pulse pressures.

The importance of watching the blood pressure as a means of avoiding overdosage in cases of vital depression is emphasized.

W. B. H.

INTESTINAL TRACT.

Acute Intestinal Obstruction. Finney, J. M. *T. Surg. Gynec. and Obst.* May 1921, Vol. 32, P. 402.

The writer based his report on 245 cases. Only in two conditions, intussusception and volvulus, did age play any important role. The former occurred almost invariably under one year, while the latter appeared after middle life. The ratio of male to female patients was 2½ to 1. The mortality was high, being 36 per cent. and depended almost entirely on the length of time which elapsed

between the onset of symptoms and the time of operation.

Those cases operated upon within 12 hrs. showed a mortality rate of 5 per cent. This rate doubled in the second 12 hrs. In the second 24 hrs. a striking advance in the rate to 31 per cent. took place. The result appeared to depend more on the condition of the patient at the time of operation, than the nature of the operation performed.

A very interesting finding was that 40 per cent. of the total number had had some form of abdominal operation previously. Pelvic operations, especially for inflammatory conditions, are followed by a very high percentage of intestinal obstruction.

In many cases a definite diagnosis is very difficult owing to the number of conditions which may simulate it at times very closely, such as, Typhoid Fever, Henoch's Purpura, pancreatitis, angioneurotic oedema, the twisted pedicle of a tumour, lead colic, gall-stones, mesenteric thrombosis, diaphragmatic pleurisy, etc. The passage of the stomach tube in doubtful cases may furnish valuable information as to the character of the stomach contents and so help materially in the diagnosis.

Of the symptoms, pain is the most constant, being noted in 83 per cent. Usually appearing early it may be at first "colicky" later to become more severe and continuous. Nausea and vomiting were present in 80 per cent. of the cases. Constipation is usually present but may be preceded by one or more movements thus emptying the bowel below the obstruction.

Distention and visible peristalsis are usually late manifestations. Tenderness is only exceptionally a marked feature. G. A. F.

Enterostomy in the Treatment of Acute Intestinal Obstruction. Summers, John E. Surg. Gynec. and Obst. May 1921, Vol. 32, P. 412.

Nelaton, in 1858, was the first surgeon to practice enterostomy successfully, in the treatment of acute intestinal obstruction.

He made a small incision in the right iliac region and sutured the first coil of distended intestine which presented itself. The next improvement was the use of Paul's glass tubes. These could be removed without

necessitating a further closure operation. Bonney in 1910 advised the opening of the jejunum, as he believed this to be the segment of toxicity. The author recommends that the drainage tube be introduced into the highest segment of the bowel that is distended and not into the highest part of the jejunum if not distended. The coils farthest away from the obstruction are heavy and contain much liquid, those nearest the obstruction are light and contain mostly gas.

The writer is of the opinion that the high mortality in acute intestinal obstruction can be greatly reduced if the principle of a properly performed and located enterostomy can be carried out. G. A. F.

The Toxic Agents Developed in the Course of Acute Intestinal Obstruction and their Action. Stone, H. B. Surg., Gynec. and Obst. May 1921, Vol. 32, P. 415.

It has now been definitely proven and accepted that the seriousness of acute intestinal obstruction is due to the presence of toxic material in the obstructed loop of the bowel. The absorption of this material causes all the characteristic symptoms. Normal mucosa of unobstructed bowel will not absorb this material. Several theories are advanced as to how this is accomplished. The formation of the toxin has given rise to some controversy. One school believes that the mucosa, from some perversion of its function, under obstruction conditions, is the source, while others contend that it is due to bacterial activity plus necrotic tissue. The exact nature of the toxins has also been a matter of dispute. All are agreed, however that these substances are derived from the splitting of protein molecules. G. A. F.

Obstruction of the Colon and Ileocaecal Region. Peck, Chas. H. Surg. Gynec. and Obst. May 1921, Vol. 32, P. 408.

The author reviewed 138 cases of obstruction which occurred between the terminal ileum and including the sigmoid. Of this group 35 were malignant. The ascending colon, hepatic flexure and sigmoid were the most frequent sites. Excision is recommended in cases where the growth is reasonably

movable and the metastases, if any, accessible. Where distention of the proximal gut is marked preliminary colostomy should always be performed. End-to-end anastomosis appears to give the best results. Palliative colostomy should be deferred as long as possible, where no radical operation is advised.

The non-malignant cases, of which there were 103, were caused by peritoneal and omental bands.

The writer believes that many of the post-operative adhesions are no doubt due to iodine which is carried into the abdomen on the hands of the operator. Careful towel protection to the wound edge and frequent rinsing of the hands should eliminate this danger. Many of these cases due to peritoneal bands will cause an obstruction as complete as any malignant growth. Division of bands is usually followed by complete recovery. Following inflammations in the right iliac fossa, the omentum is likely to be found bound down in that region. As these bands shorten they drag on the transverse colon causing considerable pain which may predominate over the symptoms of obstruction.

G. A. F.

The Operative Treatment of Fissure in Ano. (Zur Operativen Behandlung der Analfissuren). Polyx. Zentralblatt f. Chir., Feb. 1921, No. 7, P. 222.

The author excises the fissure in ano, with or without haemorrhoidal tag if present, by two semicircular incisions, the lower incision along the muco-cutaneous border of the anal orifice, and the upper extending as high as the upper limit of the fissure. The edges are united with catgut.

The patient is up on the second day and in the course of 8—10 days the condition is cured.

The operation when possible is performed under local anaesthesia.

A. B. I.

UROLOGY.

Tumours of the Kidney. Hyman, A. Surg. Gynec. and Obst. March 1921, Vol. 32, P. 216.

Dr. Hyman reports forty cases of renal tumours. Twenty-eight of these were

hypernephromata, eight mixed tumours of Wilms, two adenocarcinoma, one papilloma of renal pelvis, benign in character, one angioma of the renal pelvis. The proportion in these series closely coincides with those reported by others.

The tendency of hypernephromata to form metastases early or late, with or without clinical evidence of renal disease is not uncommon. There is a peculiar tendency of the tumours to grow into and extend along the renal vein. Haematuria is the most frequent initial symptom, then pain and finally tumour.

Haematuria is often transient and intermittent. Pain is of two types—one, colic from blood clot passing down the ureter, the other, lumbar in position, dull or neuralgic. Tumour is noticed in 60 to 80 per cent. of the cases.

Symptomatic varicocele on the side of involvement which does not disappear on lying down has been emphasized by some but not observed by the author.

Urinalysis is most important. Cystoscopy, comparative renal function, general renal function and pyelography cannot be omitted. Radiography of practically the whole body must be done to exclude metastasis in bone or lung. Stone is not infrequently found; tuberculosis and pyogenic infection can usually be excluded. Haematuria is usually more pronounced and recurs at more frequent intervals.

Nephrectomy is the only treatment, providing there are not metastatic lesions. Depending on the size of the tumour, a lumbar or trans-peritoneal operation is done.

The course of the disease is slow up to a certain point and then increases in rapidity with associated signs of malignancy. Hypernephromata occur most frequently in the fourth and fifth decades.

Wilms mixed tumours occur in childhood, most commonly before the third year; although cases have been reported in adult life. They are exceedingly malignant and show little difference in the clinical manifestations except a tendency to greater haemorrhage.

Adenocarcinoma is rare. The course of the disease is more rapid and the tumour much more malignant than hypernephroma.

The pain is very constant and severe; bleeding is more profuse and frequent.

Tumours of the renal pelvis are rare. Papilloma, benign or malignant and angioma are types met with. The symptoms are those of other renal tumours. The diagnosis is seldom possible unless tumour cells are found in the urine. The presence of vesical tumour with renal haematuria is characteristic. Pyelography demonstrating pelvic distortion and irregularity should be of considerable importance in the diagnosis.

In conclusion Dr. Hyman emphasizes the extreme malignancy of kidney tumours. He reports eleven out of twenty-eight inoperable. Twenty-seven nephrectomies were performed with two operative deaths. Twenty-three and one-third per cent. passed the three and one-half year period after operation and were apparently cured. Fifty-eight per cent. died within two years from metastasis or local recurrence. The only way to offset this mortality is early diagnosis and nephrectomy and more careful investigation of haematuria.

R. E. P.

Aspiration of the Bladder. (Dangers et Inutilite de la Ponction Capillaire Aspiratrice de la Vessie) De Berne-Lagarde, R. and Ramos; *J. d'Urol. Med. et Chir.* Vol. 10, No. 2, P. 107.

The dangers of aspiration of the bladder for the relief of retention of urine in the bladder are haemorrhage into, or infection of the pre-vesical space, extravasation of urine and injury of the peritoneum, an accident which occurs more frequently than is generally recognized.

Cases are reviewed in which the procedure had been carried out and in which operation had to be performed later in the Necker clinic for complicating infection and haemorrhage. One was the case of a soldier who had fallen across a cement embankment in a trench, and suffered a rupture of the urethra. For the urinary retention which followed, three vesical punctures were made, the last of which brought away only blood. On doing an emergency cystotomy they found a large pre-vesical haematoma, and on the anterior wall of the bladder, at the spot of the puncture, they found a spurting artery

which had been wounded by the aspirating needle. In another case, a prostatic, in whom, after ineffectual attempts at catheterization, the bladder was emptied by aspiration, a quantity of urine was found infiltrating the pre-vesical space. In the anterior wall of the bladder was revealed a circular orifice through which urine was oozing into the space of Retzius.

The authors point out that with patience and the selection of the proper instrument, it is nearly always possible to catheterize patients suffering from prostatism or urethral stricture, the class of case usually subjected to the practice. The remark of Guyon is quoted that hardly once a year does a case present itself in which catheterization is impossible by ordinary methods.

In case it is impossible to catheterize, it is better to perform at once an emergency cystotomy, which will serve as the first of a two stage operation.

F. S. P.

Abscess of the Prostate. Kretschmer, Herman L.; *Surg., Gynec. and Obst.*, March 1921, Vol. 32, P. 259.

The paper is based on forty-three cases. It is pointed out that abscess of the prostate has always been looked upon as a complication of gonorrhoea, but cases have been reported following acute infections and are of much more frequent occurrence than we have been led to believe. He groups his cases:

1. Following or complicating gonorrhoeal urethritis;
2. Metastatic abscesses;
3. Abscess following trauma, e.g., instrumentation;
4. Abscess associated with hypertrophy of the prostate;
5. Abscess associated with urethral stricture;
6. Abscess associated with appendicitis;
7. Abscess associated with stone;
8. Abscess with undetermined aetiology;
9. Abscess and general sepsis.

Of the forty-three cases, thirty gave a history of Neisser infection, recent or remote. The gonococci were demonstrated in sixteen cases; thirty of the cases showed urethritis; eleven cases showed a positive gonorrhoeal

fixation test and the gonococcus was demonstrated in all of these.

Examination of the pus from the abscess showed gonococci in eighteen, staphylococci in five; streptococci in one; both staphylococci and streptococci in two, and *b. coli* in one;

Metastatic cases, two in number; one showed a felon of the finger, the other a boil of the neck;

Abscess following instrumentation. Of these there were seventeen in number, five were gonorrhoeal, and twelve non-gonorrhoeal;

Abscess associated with benign hypertrophy of the prostate. They were three in number;

Abscess associated with urethral stricture was found in one case;

Abscess following acute appendicitis occurred in one case, thirty-one days after appendectomy—venereal history denied;

Abscess with calculi in prostate occurred in one case, was diagnosed by rectal examination and confirmed by X-ray.

Abscess in which the etiology was not determined include the remainder of series and every means to exclude infection of the genito-urinary and other systems was carefully taken;

The symptoms of prostatic abscess usually incorporated frequency of micturition, thirty-four out of forty-three cases;

Pain was present in thirty-six cases; some cases showed suprapubic pain associated with full bladder and relieved by emptying the bladder. Perineal pain was present in only eleven cases. Twenty-two cases showed pain during or after micturition. Retention of urine occurred in fourteen cases. Difficult urination was found in twenty-three other cases.

Rectal symptoms occurred in twenty cases and were described as painful defaecation or sense of fullness in the rectum;

Chills and fever were present in nineteen of the cases.

The rectal findings showed well-marked prostatic enlargement and tenderness, although fluctuation was not present in the early stages.

Three possible terminations of prostatic abscess are: resolution, rupture or opera-

tion. Four cases went on to resolution, nineteen cases ruptured into the urethra either spontaneously or after rectal examination, one case pointed into the ischio-rectal space, and it is thought that this case was not a true abscess of the prostate, but a peri-prostatic condition or phlegmon.

Sixteen cases were operated upon, one through the rectum by family physician with good recovery. The others were done through the perineum, care being taken to break down all pockets and ensure thorough drainage. Operation and drainage does not cure, and the case should be treated until prostatic strippings are pus and infection free.

R. E. P.

The Young-Stone Operation for Urethro-rectal Fistula. Davis, Edwin G. *Surg., Gynec. and Obst.* March 1921, Vol. 32, P. 225.

Dr. Davis reports 14 cases of urethro-rectal fistula, the result of perineal lithotomy, drainage of prostatic abscess or perineal prostatectomy.

The diagnosis is simple; passage of gas "per urethram" and urine "per rectum", coupled with a history of a perineal operation, leaves little doubt as to the condition.

Rectal examination usually reveals a definite fistula, seldom more than three or four millimeters in length.

The operative technique consists, firstly in super-pubic cystotomy; secondly in a racquet shaped incision from mid-perineum backwards encircling the rectum at the muco-cutaneous opening; thirdly, dissection of the rectal mucosa as in Whitehead's operation. The separation must be carried backwards until the prostate is exposed and until one is assured of sufficient rectal mucosa, so that the fistulous track can be amputated with the lower rectal mucosa and the lower end of the rectum brought down to perineal skin without tension.

A plastic repair is done by bringing the levator ani muscles well together in the mid-line.

Thirteen of the fourteen cases were successful and all had been objects of several failures with other methods.

R. E. P.

SURGERY OF THE EXTREMITIES

Habitual Dislocations. Discussion at the Meeting of the Subsection of Orthopaedics of the Royal Society of Medicine. *Brit. M. J.*, March 12th, 1921.

Mr. Laming Evans (the President) pointed out that such dislocations were by far the most common in the shoulder-joint, partly because 50 per cent. of all dislocations occurred at the shoulder, partly because of unskilled reduction, defective after-treatment, and because of lesions inflicted by the original injury. Methods of treatment were (1) palliative, by mechanical appliances (2) physiological increase of tone in muscle and ligament (3) reefing operation upon the capsule, by plication or by excision and overlapping (4) repair of ruptured tendons and musculotendinous insertions and (5) muscle transplantation i. e. the deltoid. The posterior portion of the deltoid had been passed underneath the neck of the humerus and fixed in front, with considerable success. Whether the transplanted portion retained its contractility was a debated question.

Mr. T. H. Openshaw spoke of curing ten cases by dividing the subscapularis, which by over acting was in his opinion the cause of dislocation.

Mr. W. Rowley Bristow in discussing habitual dislocation of the patella said that the operative procedures were (1) correction of knock knee if present (2) pleating of the capsule on the inner side, which he thought bound to fail (3) shortening the quadriceps (4) alteration of the line of pull of the quadriceps by transplanting half or whole of the patella tendon to the inner side.

He further suggested that the bringing forward of the external ridge in the outer condyle was a rational surgical procedure, in connection with transforming part of the tendon of the patella.

J. A. N.

Habitual or Recurrent Dislocation of the Shoulder. 44 Shoulders operated in 42 patients. Turner, Thomas T. *Surg., Gynec. and Obst.*, April 1921, P. 291.

The writer states that his paper is to show that "the axillary capsule operation is the most rational and most successful, but

that it is also anatomically almost impossible". Various difficulties in various approaches to the shoulder joint for capsulorrhaphy are discussed, and the point is made that it is better to have too much stiffness than too much movement after the operation, as the former can be overcome and the latter leans to a redislocation. The objection to the usual delto-pectoral approach is that it is too far out to get a good exposure of the capsule at the point of laceration, which is antero-inferior. The posterior axillary route, of which excellent illustrations are given, gives him the freest capsule exposure just where the variations in the joint lesion are best detected. One must beware of the circumflex nerve.

In cases of incurable redislocation the head of the humerus is excised at the level of the anatomical neck, removing the part of the bone which dislocates.

J. A. N.

Loose Bodies in Joints. Fisher, A. G. T. *Lancet*, April 23, 1921, No. 5095.

The writer classifies his subject under three headings: Group 1—Loose bodies, generally broken off osteophytes, occurring in connection with pathological joint processes such as osteo-arthritis, tabes, tuberculous disease and acute arthritis. In Group II—are loose bodies occurring in joints otherwise apparently normal, and in general having the appearance of detached portions of the articular surface. This detachment is thought to be due to trauma rather than to disease. In Group III—he places synovial chondromata of various kinds.

Case reports illustrating various types are given. An interesting section deals with the condition met with in Group II, where a loose body, usually solitary, arises by detachment of a portion of the articular surface, including bone. This has been thought to be due to "quiet necrosis" or "osteo-chondritis dessicans", but Mr. Fisher's observations and experiments show that the detachment is more likely due to trauma, particularly to a pull upon the crucial ligaments.

Removal of loose bodies in joints is of course indicated, even in the case of the bodies in osteoarthritic subjects.

J. A. N.

When to Open Knee-joints. Marshall, H. W.
Boston M. and S. J., March 24, 1921.

A rather long article in which aspects of joint disease and injury are discussed. The writer's conclusions regarding arthrotomies for synovitis are:

1. Arthrotomies are generally harmless when done by skilful surgeons. Patients are placed conveniently for efficient control of other steps in treatment when they are in hospitals, and excellent recoveries are the rule in instances of non-purulent synovitis.

2. Early arthrotomies are unnecessary as well as harmless in non-purulent cases.

3. Arthrotomies performed during later stages of slowly subsiding chronic knee inflammations of considerable severity possess distinct advantages.

In villous arthritis operations are performed with benefit in many instances and at all stages. Patients' occupations and positions in life, as well as severity and chronicity of symptoms, hold an important place in determining what shall be done.

Tuberculous knee joints in adults should be excised as soon as definite diagnosis is made.

J. A. N.

Reconstruction Surgery and its Application to Civilian Practice. Starr, Clarence L.
Surg., Gynec. and Obst., April 1921.

Dr. Starr in this long and interesting paper covers a great deal of ground. He condemns too extensive bony "debridement" in compound fractures, and points out that mild sepsis is a stimulant to bone granulations rather than a source of non-union.

The treatment of a non-collapsible bone cavity by its conversion into a saucer-like one filled with a muscle flap is advocated. The inlay bone graft (homogeneous) has proved more satisfactory, the fitting to be done by the single rather than the twin saw. In many cases a graft of diamond shape sprung in between cleft bone-ends does very good service.

It would seem almost unnecessary to suggest that in no instance can a steel plate screwed to bone fragments across a fibrous

non-union ever result in union, and yet one still sees instances where such an operation has been performed.

Much reconstruction surgery is preventable, and if a joint is to be ankylosed there are certain positions in which an ankylosed limb is most useful. These positions are gone into fully.

The technique of shoulder arthrodesis by the writer's method is given. The restoration of function in cases of irreparable nerve injury by means of tendon transfer is discussed, and the procedure for wrist and finger drop from musculospiral paralysis elaborated.

Nerve suture is discussed, the writer pointing out that he has seen no case of recovery where gaps have been bridged either by nerve graft or by strands of fascia, catgut, etc.

J. A. N.

A Preliminary Study of the Aetiology of Osteomalacia in the City of Bombay. Hutchison, H.S. and Patel, P. T. Glasgow, M. J., April 1921, Vol. 95.

The writers divide the various classes of the Bombay Community into Mahomedans, Hindus, and other classes. Women only are concerned, as in India osteomalacia is practically never seen in men. Mahomedan women as contrasted with Hindu women, of the middle and upper classes are strictly purdah, i.e. they do not appear unveiled in public, and practically never leave their houses during the day. Their houses are ill ventilated. The large preponderance of osteomalacia among Mahomedan, as contrasted with Hindu women, proves definitely that lack of fresh air and exercise—the result of the purdah system—is by far the most potent factor in the production of the disease. There is no evidence to show that dietetic deficiency is a cause of osteomalacia, as the disease is not uncommon among the wealthiest classes of the community; while among the poorer classes the deficiency of animal fat in the diet is common to all.

There is no reason to believe that child marriage and prolonged lactation are important factors. The more or less sudden onset associated with fever in many cases

and the rapid softening of the bones suggest a possible infective condition.

It is to be noted that the osteomalacia studied in this article is largely confined to the bones of the pelvis and makes its presence known through difficult child birth.

J. A. N.

Epicondylitis Humeri. Carp, Louis. *Surg. Gynec. and Obst.*, March 1921, Vol. 32, P. 257.

In this article the condition known as epicondylitis humeri or tennis elbow is described. Usually traumatic in origin, the main point in its symptomatology is pain and tenderness in connection with the external condyle of the humerus. X-rays are usually negative, and treatment seems of little use. It seems self-limited, and in one series of cases the average duration was 6 weeks. The aetiology is doubtful, though strain as a cause is favored by most writers.

J. A. N.

RADIOLOGY.

Radium, Its Use in Medicine. Gann, Dewell, Jr. *Urologic and Cutaneous Review*, October 1920, Vol. 24, P. 563.

Occurrence. Chief supply in America from Carnotite ores of Colorado. One gram of radium obtained from reduction of 350 tons of ore;

Salts. Metallic radium too unstable for therapeutic use, so its salts are employed for this purpose. Those commonly used are the bromide, the chloride, the carbonate and the sulphate. These contain respectively 53.6; 76.1; 79.0 and 70.2 per cent. of radium element;

Application. Two kinds of applicators employed; (a) flat applicators for superficial lesions, and (b) tube applicators for deep ones. A full strength flat applicator contains 10 milligrams of radium element spread over one square centimeter of surface. Tube applicators usually contain 25 milligrams radium element. In both varieties of applicators the alpha and beta rays are screened by glass and brass or silver capsules. Lead and rubber are also used.

The gamma rays pass through with ease and are thus the only rays used in medicine.

Radium is also given internally by inhalation, by mouth, by subcutaneous and intravenous injection.

The application may be continuous or intermittent. Thus for a small epithelioma, a flat applicator may be applied for 6 to 8 days. The end results are the same in each case, but the continuous application causes much more severe reactions.

Action on tissues. In small doses it stimulates and in large doses it destroys tissues. Its destructive action is much more marked on malignant than upon normal cells. The rule is that the more rapidly growing and less highly specialized the cell (i.e. the more embryonic in type), the more it is affected by the rays. As the effect of the rays diminishes with the square of the distance they have to travel to reach their objective, it is necessary, in order to have all parts of a tumour treated with equal intensity, to (a) submit deep tumours to a "cross-fire" from several applicators imbedded in the tissues, and (b) place the applicators at varying distances from the surface of the body.

Reaction occurs from 1 to 3 weeks after exposure to the rays. Four degrees are recognized: 1. erythema; 2. erythema with desquamation; 3. vesication with superficial ulceration; 4. deep ulceration.

Microscopically, after a second degree reaction one sees: After 10 days the malignant cells become enlarged and vacuolized; the nuclei shrink and take a deeper stain (hyperchromatosis). Following these changes degeneration occurs rapidly; karyolysis and cytolysis are observed and phagocytosis is in evidence. The blood vessels show proliferation of the endothelial cells with complete blocking of their lumina; media and adventitia show hyaline degeneration. Coincidentally with the degeneration of the malignant cells there is a proliferation of the connective tissue and fibrosis results. The atrophy of the malignant cells and their replacement by fibrous tissue is complete in two or three months. The normal cells share to some extent in the above changes, but recover much more readily and completely than do the malignant cells.

Constitutional manifestations: These are

not marked except in those cases which have received intensely heavy dosage. These develop headache, backache, nausea and vomiting. As a rule, cases have only slight nausea and a feeling of weakness. These appear from one to four days after treatment and pass often from 48 to 72 hours. H. C. M.

X-ray Radiation and Cancer. Morton, Reginald. *Brit. M. J.*, Jan. 29th, 1921, P. 172.

The author believes that radiation is more likely to provide cure for cancer than anything else. He advocates exact dosage with a sixteen inch spark gap and a filter of twelve millimeters of aluminium. The Coolidge tube is unsuitable for the treatment. At Erlangen the tube is standardized by biological methods and recalibrated at intervals. A 35 minute treatment is followed by redness in a week. No ulcer follows and tanning occurs after three weeks. This is the unit dose. Taking this as 100 a cancer cell requires 110 to destroy it; 70 to 90 will paralyze it, so to speak, as it may recover. A dose of forty stimulates it to increased growth. Six ports of entry are used for the uterus. This is not possible for breast cases which are treated at a long distance. The treatment may last from five to ten hours. In the Erlangen results dating back from 1918, 20 of 24 cases of uterine cancer are quite well. Since 1917, 75 per cent. of the mammary cases are clinically cured. A. H. P.

The Immunizing Effects of X-ray in Carcinoma. Johnson, F. Harnaman, *Brit. M. J.*, March 5th, 1921, P. 365.

The author replies to Dr. Morton's claims for the Erlangen method of treating cancer by x-rays. Neither quantity nor quality of x-rays in themselves guarantees success. X-rays act by local and general stimulation of the protective mechanisms of the body. It would be dangerous to operate after the Erlangen massive doses. The author advocates instead eight small doses distributed over three weeks. He believes that the x-rays act like vaccines raising the resistance of the patient to cancer invasion. The results of the Erlangen treatment are not convincing. The immunizing effects of

x-rays are seen in tubercle and Graves' disease and he infers from his experience that there is an immunizing effect of x-rays in cancer. A. H. P.

Treatment by X-rays and Radium. Knox, Robert. *Brit. M. J.*, Feb. 26th, 1921, P. 304.

X-rays are the best treatment for tinea capitis. In rodent ulcer radium is better than x-rays, as there is less frequent relapse after using radium. When it relapses there is resistance to second healing. Lupus vulgaris sometimes yields readily. Too much treatment of it exposes to the danger of lupus carcinoma. Hyperidrosis is readily controlled by x-rays. In leukaemia the immediate effect is striking and the control may go on for years, but the final result is nearly always relapse. Radium is better than x-rays also in Banti's disease. In exophthalmic goitre radium should be used. Simple inflammation of lymphatic glands and lymphadenoma quickly responds, so also with sarcoma, but with the latter, relapse occurs. With tubercle and carcinoma the response is slow. In fibromyoma of the uterus reduction occurs to half, or a third, but tumours never disappear. Great improvement, however, occurs in health from cessation of the haemorrhage. Some cases do not respond. In carcinoma of the breast he advises X-ray treatment before and after the operation. Some inoperable cases become operable after x-rays. A. H. P.

X-ray Treatment of Leukaemia. Richards, G. E. *The Journal of Radiology*, Vol. 2, P. 23.

Because roentgenologists and clinicians have not made the fullest use of X-ray therapy in treatment of leukaemia, the author submits his results in a series of 22 cases.

Having adopted the view that the disease is essentially a hyperplasia of the spleen and bone marrow, the technique of treatment is designed to depress the function of cells rather than to destroy cells.

The skin surface over the spleen is divided into areas four inches square, which are treated in rotation, one area each day. When the spleen has been covered, the long bones

are then exposed in rotation with the same time interval. The dosage for each area is determined thus:—6-7" spark gap, through 2 mm. aluminum, 25 milliamp minutes at ten inch distance. This treatment is repeated at two-week intervals until the white blood count is stationary at ten to twelve thousand. Subsequent to this, "treatments are repeated at intervals of one month during the remainder of the patient's life." The life of a patient so treated is prolonged and rendered more comfortable.

A. S. K.

MEDICINE.

Growth on Diets Containing More Than Ninety per cent. of Protein. Osborne, T. B. and Mendel, L. B. *Proc. Soc. Exper. Biol. and Med.*, March 16th, 1921, Vol. 18, P. 167.

The authors have been successful in obtaining growth in rats to three times their weight at the beginning of the trial by feeding on a food mixture containing protein 95 per cent., inorganic salts 5 per cent., along with a supply of vitamins A and B in the form of tablets of alfalfa and dried brewery yeast. The vitamin bearing substances were the only sources of fat and carbohydrate, the protein being supplied in the form of casein. Whether rats will attain adult size and function on such diets is not yet known. If protein alone will act as the sole source of energy and tissue substance new experimental fields in nutrition can be approached.

E. H. M.

The Glucose Mobilization Rate in Hyperthyroidism. Sanger, B. J. *Pros. Soc. Exper. Biol. and Med.*, Jan. 19th, 1921, Vol. 18, P. 117.

The study of the carbohydrate utilization in hyperthyroidism was attempted through the respiratory quotient and the blood sugar. Both were determined when fasting and at frequent intervals after the injection of 1.75 grams of glucose per kilo body weight. In all, six normal controls and eight definite cases of hyperthyroidism were studied. A typical blood sugar curve was present in all but one of the hyperthyroid cases. The evi-

dence indicated that carbohydrate is burnt in cases of hyperthyroidism in a perfectly normal manner, but that the liver has a decreased ability to demobilize carbohydrate from the blood stream. This would account for the low glycogen content of the livers of mice and rabbits, thyroid fed, while on high carbohydrate diets, and for the well known tendency of cases of hyperthyroidism to develop acidosis.

E. H. M.

Polyarticular Rheumatism Deformans of the Infectious Type and Vaccinotherapy. (Rhumatisme poly-articulaire deformant du type infectieux et vaccinotherapie). De Senarclens. *Revue Med. de la Suisse Rom.* Jan. 1921, No. 1, P. 24.

The writer insists on the correct diagnosis of this condition from other forms of so called dystrophic rheumatism, e.g., gouty rheumatism. Rheumatoid arthritis generally begins under forty-five years, oftenest in women, after a long preliminary period of indefinite pains, often accompanied by muscular atrophy, when the localized joint symptoms appear. There is early ulceration and destruction of the cartilages with the characteristic white, lustrous, "glossy skin", over oedematous subcutaneous tissue. There are frequent remissions, and no fever is experienced.

In other forms of dystrophic rheumatism with bony deformity, the disease appears after the fiftieth year, has no preference for either sex, develops slowly but steadily, with renal sclerosis and myocarditis as terminal factors. The limbs are not oedematous but wasted, and there is no involvement of the cartilages.

After a brief review of the possible aetiological factors, with special reference to suppurative foci, he proceeds to discuss vaccinotherapy. He pays a tribute to the work done in this connection in America and states some of the conclusions drawn amongst others, that this form of treatment is of particular value in articular disorders, when the germ isolated in the primary focus is a streptococcus; and also that in many cases the micro-organism of the local suppuration is found in the urine of the patient. This latter would furnish a means of producing a

vaccine, when the primary focus cannot be found. He then gives in detail Dr. Warren Crowe's method of preparing a vaccine from a *Staphylococcus albus* found in the bladder of several cases and first described in *The Lancet* in April 1913. He himself reports a case treated by this method with most satisfactory results.

In discussing Crowe's later work (*Lancet* October 1919) he summarizes the latter's recommendations—that the treatment should be reserved for clear cases, that it is better not to use it in mono-articular forms, and that a proved stock vaccine is better than the autogenous forms. He warns against excessive doses at the start, which should never be above 500,000 units; and states that unlike the method of proteid injections—e.g., milk, to produce a general reaction, this is to be avoided with the vaccine because it is harmful.

Even if the supposed causative agent is not found in the urine, should one employ vaccinothrapy? He concludes in the affirmative for two reasons:—(1) because the organism may be quite virulent in the system without appearing in the urine; (2) because according to Wright's theories of the non-specificity of vaccines, "innoculation produces not only a direct immunization, but also a collateral one." So even if the *staphylococcus* from which the vaccine is made were found not to be the causative agent of rheumatoid arthritis, this would not prevent the employment of the vaccine. J. L. D.

DERMATOLOGY.

The Role of the Endocrine Glands in the Aetiology and Treatment of Acne. Hollander, Lester. *Arch. Derm. and Syph.*, May 1921.

The view is advanced that acne is largely dependent on disturbed endocrine secretions. Observations have been made of the fact that on the establishment of normal sexual relations acne will disappear. The writer thinks that the frequent incidence of the disease at puberty depends on the upsetting

of the balance of metabolism by the demands of the growing organism.

While he holds that the internal secretion of the gonads is chiefly connected with this disease, he has not as yet had any success in treatment with their extract.

Further Indications for Pepsin-Hydrochloric Acid Treatment. Allswede, E. H. *Arch. Derm. and Syph.*, May 1921.

Unna has shown experimentally that a combination of pepsin and hydrochloric acid will penetrate the horny layer of the epidermis and assist in carrying in chemical agents. This fact is taken advantage of in treating keloids large cicatrices and the indurations following acne.

Application is by means of compresses, injections or ointment, using ten parts of pepsin, one part each of HCl and phenol, with water to two hundred parts. The phenol prevents putrefaction. Boric acid may replace the HCl where there is irritation; the action is similar but milder in degree. In ointment form, one hundred parts of petrolatum is used.

The accompanying medication used in keloids, etc., was pyrogallol applied as a varnish under the pepsin-HCl. The collodion of the varnish opens up enough to allow the passage of the digesting substance.

H. E. M.

Picric Acid in the Treatment of Severe Epidermophyton Infection. Weiss, R. S. *Arch. Derm. and Syph.*, April 1921, Part 1.

Numerous cases of epidermophyton infection have been reported in the last two years. In some of these there was much involvement of the toes and interdigital spaces, with considerable disablement.

Picric acid gave excellent results in such cases, applied in watery solution on cotton, and renewed thrice daily. Caution is to be used where the treatment lasts longer than one week.

H. E. M.

News Items

NOVA SCOTIA

Dr. T. M. Sieniewicz of Halifax, Nova Scotia, for three and a half years associated with Dr. A. F. Miller in the Tuberculosis Sanatorium at Kentville, has been appointed to the position of Tuberculosis Examiner in the Massachusetts-Halifax Health Commission. Dr. Sieniewicz succeeds Dr. D. A. Craig, the first appointee in this position. All of his time will be given to the public health work of the Commission and to consultation work with physicians of Halifax and Dartmouth.

The monthly report of the Health Centres work just presented to the Massachusetts-Halifax Health Commission by the Chief Nurse, states that 486 nursing, medical and dental consultations were held in the various Health Centre clinics during April; 117 in the Child Welfare and Prenatal Division; 72 in the Ear, Nose and Throat Division; 14 in the special Psychopathic clinic for the disaster injured, and 87 in the Preschool Age Dental service. One hundred and sixty-nine new patients were registered for advice and treatment; forty patients in attendance during previous months were discharged during April.

Eleven classes in First Aid were conducted during April by representatives of the St. John Ambulance Association in the Health Centre at Admiralty House. Three classes in First Aid were held in the teaching room of the Dartmouth Health Centre. Outside talks were also given by nurses associated with the Health Centres during the month. The Chief Nurse delivered an address at the annual meeting of the V.A.D.'s. The work of the Health Centres is growing so rapidly that the staff have difficulty in keeping up with the growth.

A special dental service is being organized by the Executive Officers of the Commission for the summer months. It will be under the advice and general guidance of the Consultant in Dentistry, Dr. Frank Woodbury and Dr. Arabella MacKenzie, a paediodentist at the preschool age dental clinic in Admiralty House Health Centre.

The School Board of Halifax has arranged to have the school nurses during the latter half of May and June make social investigations in the homes of children needing dental work and make engagements for their treatment in the Dental Infirmary. These nurses will give a month of summer holiday to this work. The newly appointed school nurse will begin work at once in order to help speed up this campaign of dental hygiene.

Children having need of operation for the removal of adenoids and tonsils will be given right of way in the dental hygiene clinic. In the beginning only children under ten years of age will be treated. Later in the summer perhaps, the age limit may be raised to twelve years.

The same opportunities will be afforded the school children of Dartmouth, both in the dental hygiene and the nose and throat clinics. These special clinical services will be of great interest to members of the Canadian Medical Association, who meet here in June, and will serve to demonstrate to the profession of Canada that Halifax is thoroughly awake to health needs.

It is doubtful if any vacations will be given the staff until August, when this period of special activity will have ended.

The convocation of Dalhousie University was held on May 5th, when more than one hundred degrees were conferred. Ten members of the class of Public Health Nursing received their diplomas. Fourteen graduates, thirteen men and one woman, were M.D., C.M., and six men received the degree,

of D.D.S. The Hon. N. W. Rowell, addressed the graduates.

Professor Fraser Harris, of the Chair of Physiology at Dalhousie University, has just been informed that his book on "Nerves" (Home University Library) has been translated into Italian.

BRITISH COLUMBIA

DRUGLESS HEALING AND CHIROPRACTIC

REPORT OF LEGISLATIVE COMMITTEE ON PROPOSED BILLS

Legislative Committee Room,
March 29th, 1921.

Mr. Speaker:

Your Committee appointed to inquire and report in respect to the proposed Drugless Healing Bill, being No. 23, and the proposed Chiropractic Bill, No. 24, beg to submit as their final report the following:—

As on the inquiry into the proposed Optometry Bill, exhaustive evidence was also presented to the Committee for and against these proposed Bills. The Committee had the views, apparently of the most prominent representatives of the drugless healing art and of the best practitioners in Chiropractic, in support of these measures, while the Medical Council, represented by prominent and reputable members of the medical profession, opposed both Bills.

Your Committee have taken great pains to consider with the utmost care the evidence adduced and the representations made, particularly as a great many estimable citizens have apparently received benefit from the chiropractors. Whether these alleged results are more imaginary than real or whether they have yet been sufficiently tested over a long enough period of time, probably remains to be seen.

As in the consideration of the Optometry Bill—so in respect of these two Bills—your Committee had the benefit of the exhaustive

report of Mr. Justice Hodgins, referred to in the previous report of this Committee. His report is voluminous and is quite applicable to the principles under consideration.

The general education obtained in Canada through the medical faculties of the Universities is, your Committee believe, well abreast of the times. The course has been gradually enlarged to keep pace with expanding medical knowledge, and research institutions in different parts of the world are engaged in enlarging the boundaries of medical knowledge, with an open mind to new discoveries possessing merit. On the other hand, it is difficult, from the evidence submitted, oral and documentary, to ascertain the educational standards or scientific knowledge of those who profess to find in the practice of chiropractic and drugless healing a cure for a great many, if not all, ills.

From the curriculums before us of several American Institutions, and the statements made, it would appear that the standards required and the length of time required for study vary, and on the whole are not long enough to afford sufficient training. It would appear, too, that these schools are without the necessary equipment. It is therefore not possible to say that the medical attainments of those now asking for a change in the law are sufficiently high.

The question to be decided by the Committee is this: Have the chiropractors and the drugless healers made out a case for an alteration of the present law, so that without hindrance they may be permitted to practice the healing art?

One of the leading Chiropractic Colleges in the United States is the "Palmer Institute." Dr. B. J. Palmer, the head of this institution, in giving evidence in the case of the State vs. Jansheski, in December, 1910, when asked whether, when a patient came to a chiropractor, he was asked the history of the case, answered: "No, because it be of no value"; and in answer to why that was so, said: "A person comes to us without telling us what the trouble is; it makes no difference whether a physician has already diagnosed it as insanity, appendicitis, indigestion, or anything they call it. The chiropractor needs to know nothing about that case from a physician's standpoint; it is immaterial, yet he can take that same case, put it down on his benches and analyse that spine just as accurately without knowing those things; in fact, sometimes, I think better. . . . It is not essential the chiropractor should know what the patient said he had, but you can adjust the current for it running into the organ, and the patient is well. That is where chiropractics becomes purely a mechanical proposition, a mechanical and electrical-making circuit proposition in a man."

The definition of this treatment in technical terms was given by McNamara, of the Universal Chiropractic College, Davenport, Iowa, as follows: "The theory sustaining this system presumes that in consequence of displaced vertebra the inter-vertebral foramina (openings) are occluded (closed), through which the spinal nerves pass. . . . In this way the nerves are pinched, and chiropractors assume that such pinching is responsible for 95 per cent. of all diseases. Chiropractic concerns itself with an adjustment of the subluxations, thus removing the pressure on the nerves."

Reducing it to simple language, the chiropractors affect to find traces of practically all diseases in subluxations of the spine, and their treatment is confined to the manipulation of the spine by hand. It is rather a shock to even the superficial knowledge of the layman, to be told that 95 per cent. of all diseases finds a manifestation in the spinal column. The assertion is emphatically disputed by members of the medical profession, and if knowledge, training, and research is necessary to arrive at a conclusion on such

a question then certainly the medical fraternity are better able to give an opinion than the followers of these cults.

One of the chiropractors examined claimed to have cured such a wide variety of diseases as chronic colites, kidney stone, dropsy, chronic biliousness, rheumatism, chronic ulcer, ulcerated stomach, tubercular spine, rickets, etc. These diseases, they say, manifest themselves by a displacement of the spine. The spread of disease by germs would appear to be of secondary consideration. In fact, one chiropractor stated that, granted the lung was normal, one could swallow tubercular germs by the million and never take the disease. The same witness, speaking of kidney stone, averred that a man's vertebra must show a subluxation, otherwise he would not have a stone in the kidney.

It would seem apparent that the health and safety of the public is involved in the indiscriminate application of theories such as these to the cure of disease. Public safety is indebted to medical science for the prevention of the spread of contagious diseases; for sanitary regulations and hygienic precautions, the failure to observe which would be disastrous. The standard of knowledge must be maintained at a high point, and there must be some recognized body who, from training and experience are competent to fix these standards. That recognized body hitherto has been the Medical Council, and your Committee can see no reason from the evidence adduced why it should not continue to exercise these functions in the future.

The fundamental requirement in the treatment of disease is ability to make a diagnosis. It is essential to first know what the trouble is before attempting to cure it. That involves a knowledge of and study of certain standard subjects. Your Committee do not believe for a moment, from the evidence, that the only diagnosis necessary is to feel for certain alleged displacements in the spinal column.

We concur with the statement of Mr. Justice Hodgins, whose investigations occupied many months, involving personal examination of these chiropractic institutions, that: "I cannot bring myself to the point of accepting, as part of our legalized medical provision

for the sick, a system which denies the need of diagnosis, refers 95 per cent. of disease to one and the same cause, and turns its back resolutely upon all modern medical scientific methods as being founded on nothing, and unworthy even to be discussed.

Your Committee do not doubt that beneficial results have been obtained from the treatment of chiropractors. They have no reason to doubt the word of estimable people who say so. It must be borne in mind, however, that the most of these are chronic cases, and it sometimes happens that by the power of suggestion good results are obtained, particularly in neurotic cases. The Committee were given instances of marvelous cures of shell shock cases during the war as a result of mental suggestion. No doubt new discoveries have been made, and will continue to be made, in medical science; but it is hardly likely that any discovery will enable us to safely dispense with the elementary requirement of diagnosis in the treatment of diseases, and to diagnose it is necessary to have a wider knowledge of the anatomy and of fundamental subjects than simply a certain familiarity with the spinal column.

The chiropractors object to the Drugless Healers Bill, and the latter object to the proposed legislation of the former on the ground that their Bill is all-inclusive. It is sufficient to say, in reference to the Drugless Healing Bill, that the various branches of study pursued by them are simply special courses which are recognized in medical work. This is true of all the branches of treatment referred to in this Bill, except chiropractic. These different types of treatment are carried on by the drugless healers at present really as laymen without sufficient qualifications for the work. They should qualify under the "Medical Act," and then if they so desire specialize in these particular branches.

Notwithstanding the foregoing views, the Committee do not feel that chiropractors or drugless healers should be prevented from

practising. We only say that they should first be qualified. They should, before being permitted to practise within the Province, pass an examination satisfactory to the Medical Council, on the following primary subjects: Anatomy, physiology, chemistry, toxicology, pathology, bacteriology, histology, neurology, physical diagnosis, obstetrics, gynecology, minor surgery, hygiene, and the principles and practice of chiropractic. Before taking this examination they should be graduates of a recognized school or college of chiropractic which at least teaches a residence course of three years of six months each year.

The Medical Council in prescribing examinations for applicants for registration as chiropractors should appoint at least one of their number to set the examination in the principles and practice of chiropractic. After passing the examination outlined above they should be registered as a member of the college.

The suggestion that chiropractors would be discriminated against in examinations is not based on fact, as the method of conducting examinations by the Council, by number rather than by name, makes this impossible.

Your Committee therefore recommends that the "Medical Act" be amended to include these provisions. It would be a guarantee to the public that all practitioners were qualified practitioners—a most desirable thing. The chiropractors would prefer to set their own standards and have a Statute providing for a governing body of its own. This would not be safe, or in the public interest. They are doing medical work, curing or attempting to cure disease. It is the accredited representatives of the medical profession—if they are honest and fair, and there has been no suggestion to the contrary—who are best fitted to prescribe the necessary standards.

This report represents the unanimous views of the Committee.

We submit the evidence herewith.

M. A. Macdonald, Chairman.

Obituary

DR. W. H. P. HILL

To the grief of his friends and the great loss of the community Dr. W.H.P. (Harry) Hill died suddenly at the wheel of his car on Saturday, July 23rd. He was born in Edinburgh, Scotland, the son of the late Rev. J. Edgar Hill, D.D., Minister of St. Andrews Church of Scotland in Montreal, and was educated at the Montreal High School and at McGill University, where he graduated in medicine in 1900.

After an internship in the Montreal General Hospital he took his triple qualification in London, and practised for a time in England, later settling in Montreal where he became attached as Clinical Assistant in Surgery to the Montreal General Hospital, later becoming out-patient surgeon.

He went overseas in 1915 with No. 3 General Hospital (McGill) returning at the end of 1916 with the rank of Major. In 1918 he was invited to the Royal Victoria Hospital as Associate Surgeon and was followed by the esteem and affection of his old colleagues.

As a class friend and associate of the late R. P. Campbell he had many qualities in common with him. Modest of demeanour and quiet of speech he yet inspired his colleagues and patients with the greatest confidence. He combined in an unusual degree soundness of clinical judgement with smoothness and dexterity as an operator, and his bearing toward rich and poor alike had in it the courtliness of another generation.

As Lecturer in Surgery in McGill University he was a clear incisive teacher, whom students looked to with admiration.

He ranked high in that strong body which the Scotch Manse has given to the profession of medicine, and he will be remembered by many, not only as an outstanding surgeon, but as a courteous, kindly Christian gentleman.

Dr. Hill married Miss Isabel Johnston, daughter of the late James Johnston, Esq., of Montreal, who with two sons and two daughters survives him.

DR. MAX O. KLOTZ

In the death of Dr. Max O. Klotz, Ottawa loses a prominent surgeon and the Association one of its active members.

Dr. Klotz was born in Preston, Ont. in 1874, a son of Otto J. Klotz, Director of the Dominion Observatory, and graduated at Toronto in 1895. He has practiced in Ottawa since that date where he acquired an extensive practice and attained many honorary offices in the gift of the profession. For several years he restricted his work to surgery. He was surgeon of the Protestant Hospital, and at the time of his death was President of the Ottawa Medico-Chirurgical Society. He represented his district in the Ontario Medical Council for several years, and was President of the Council in 1913.

Dr. Oscar Klotz, formerly of McGill University, now of the Rockefeller Institute, is a brother.

DR. CHARLES E. GRAHAM

Dr. Charles E. Graham one of the oldest physicians of the Ottawa Valley died at his residence, Hull, Que., on January 13th, aged 76 years.

Dr. Graham graduated at McGill in 1866 and begun the practice of his profession in Hull the following year. He retired from active work several years ago, owing to failing health. Notwithstanding an active practice he found time to fill various public offices on the board of health, the city council, and filled with distinction the Mayor's chair. He was Justice of the Peace and Coroner for his district.

He married a granddaughter of Philimon Wright, the founder of Hull. He is survived

by two sons, G.D. and C.K. Graham and one daughter, Mrs. (Dr.) Mayburry, of Ottawa.

DR. WALLACE CALVIN ABBOTT

Dr. Wallace Calvin Abbott died at his home in Chicago on July 4th. He graduated from the University of Michigan as Doctor of Medicine in 1885, and in the following

year engaged in the practice of medicine in Chicago, building up a large practice on the North Side and winning many friends.

During this time Doctor Abbott established The Abbott Alkaloidal Company, now known as The Abbott Laboratories, of which firm he was President continuously from the time of its establishment, more than thirty years ago, until his death.

Book Reviews

THE ROENTGEN DIAGNOSIS OF DISEASES OF THE ALIMENTARY CANAL. By R. D. CARMAN, Mayo Clinic.

This is the second edition of this work, the first having appeared early in 1917. Two new chapters have been added, one on Hour-glass Stomach, and one giving a chronologic abstract of the published work on Pneumoperitoneum.

As in the first edition, the text is excellent. The matter is presented in a very clear style, and each chapter is profusely illustrated with reproductions.

One of the features which adds greatly to the work, is the Bibliography which is added at the end of each chapter, and provides the reader with a very complete list of published papers on the particular subject dealt with.

The attention of the general reader, and of every internist and teacher, should be directed to the chapter on the normal stomach, in which it is fully demonstrated that the "Normal" stomach is purely relative, and must be considered in the light of many factors, the chief of which are: Bodily type or habitus; the abdominal wall; gastric tonus, etc.

Of these one may be quoted "the chief test by which the stomach is to be adjudged of normal tone is its *correspondence to the habitus of the individual*, and not its form, size and position alone."

Photographs of persons conforming to the different types of bodily habitus are shown with tracings of the stomach in the erect posture and Roentgenograms of normal stomachs in each of

the several types, as well as of the commoner variations in tone in the gastric musculature proper. This chapter should go far towards correcting the older teaching as to what constitutes a "Normal" stomach.

Following this, the many variations which occur in the form, tone, position, size, mobility, peristalsis and motility are fully dealt with, and in connection with the latter a comparison is made of the results obtained by the Roentgen-ray and other clinical methods.

An entire chapter is devoted to spasm. Since spasm is the "bete noir" of most Roentgenologists, and the cause of much of the indefiniteness of gastric symptomatology, this chapter is very much to the point and will repay the clinician quite as fully as the Roentgenologists for its careful perusal.

The diagnosis of Gastric Cancer is very fully dealt with, and many cases are quoted with their histories. The points of differentiation between true and false filling defects, and between cancer and other tumours, both intrinsic and extrinsic, are very completely indicated.

Three forms of cancer are recognized:

1. Proliferative or fungous type.
2. Infiltrative or scirrhus.
3. Degenerative, colloid or mucoid.

While the importance of the early recognition of cancer is admitted as offering the greatest chance of operative cure, "It is also highly important that the patient shall not be subjected to needless surgery, and where the Roentgen findings, plus the clinical features of the case do not quite justify surgical exploration, the patient should be

re-examined at short intervals, until a decision is reached."

Too often the Röntgenologist finds himself called upon by the surgeon or physician to commit himself to a positive opinion upon a single examination, when the data is insufficient to justify any such request.

Leather bottle stomach, syphilis, and various other benign tumour-producing lesions of the stomach are discussed with reports and case histories, while the chapter on ulcer is very full. Four types are described:

1. Small, mucous-membrane erosions.
2. Penetrating or perforating with deep craters.
3. Perforated.
4. Carcinomatous ulcers.

There seems still to be some uncertainty among many members of the profession as to the accuracy of the X-ray method in recognition of gastric ulcer, and one wishes the author had made a more authoritative statement upon this point. He says very modestly "At the present stage, the accuracy of the Röntgen diagnosis of gastric ulcer is greater than is generally appreciated, and considerably exceeds that of customary clinical methods." This we believe is an unnecessarily conservative view to take in view of the known high percentages in his own and other's work.

The controversy as to the degeneration of an ulcer into carcinoma is touched upon lightly in one paragraph. The chief evidence of a suspicious character he considers extreme size of the crater, "An ulcer with a niche 3 c. m. or more in diameter is likely to prove cancerous." The importance of an exact diagnosis is urged.

The new chapter on Hour-glass Stomach is an admirable presentation of the doctrine which Röntgenologists have been teaching for several years past, and which is well summarized by the author in one sentence. "Hour-glass Stomach should not be considered a disease entity, but an end-result of various pathologic processes, gastric and perigastric."

Many of the rarer forms of gastric disease are illustrated, and a short chapter on the stomach in infants and children summarizes most of the essential information as we have it at present.

The author goes in some detail into the "Stomach after operation," and gives his observations upon thirty cases of regurgitant vomiting following gastro-enterostomy, all of which were re-opened.

In the Röntgen diagnosis of Gall-stones the

author has adopted a conservative attitude and places the percentage of accuracy of his own work at 50 per cent., where the essential disease is cholecystitis. He believes that every effort should be made to perfect the method, and advises the Röntgenologist to use it constantly, "even though his failures far outnumber his successes."

Duodenal ulcer is recognized by means of:

1. Direct signs.
2. Indirect signs.

The author appears to attach rather more importance to the second group than the majority of present-day Röntgenologists, while giving first place to the demonstration of a definite deformity of the cap.

The articles on the small intestine and appendix and colon are full, and the claim made for the X-ray method conservative. The book closes with an account of the newer work which is being done on Pneumoperitoneum, with a complete Bibliography of the published work on this subject.

G. E. R.

DIAGNOSTIC AND THERAPEUTIC TECHNIC. A Manual of Practical Procedures Employed in Diagnosis and Treatment. By ALBERT S. MORROW, M.D., Late Lieut.-Colonel, M.C., U.S.A., Attending Surgeon to the City Hospital, and to St. Bartholomew's Hospital, New York City; Consulting Surgeon to the Nassau Hospital, Mineola, L.I. Third Edition, Entirely Reset, Octavo of 894 pages, with 892 illustrations, mostly original. Philadelphia and London, 1921. Cloth, \$8.75, net. W. B. Saunders Company. Toronto: The J. F. Hartz Co., Ltd.

The changes and additions which appear in this new edition bring it well up to date and make it a safe and valuable guide for the general practitioner and hospital interne in carrying out the procedures here detailed.

General diagnostic and therapeutic methods are first described followed by those applicable to special organs and regions of the body. The work is profusely illustrated by excellent line drawings, making the technique of various procedures quite clear. To make each section complete in itself there has been much repetition, and it is questionable whether this is desirable because of the added bulk—for example, plates 76 to 83 reappear later as plates 308 to 314, the head mirror appears six times under ear conditions, six times in the

nose section, three times in the larynx section, as well as in other sections. Numerous other plates are also repeated. The section on Pneumothorax is not quite up to date, but the author is to be congratulated on his volume as now revised, reset and reprinted. It contains in one volume so much that is usually to be found only by consulting many works on medicine, surgery and laboratory procedures, that it forms a valuable ready reference volume for the practitioner. J. H. E.

KEEN'S SURGERY, Volume VII. By SURGICAL EXPERTS. Edited by W. W. KEEN, M.D., LL.D., Hon. F.R.C.S. England and Edinboro, Emeritus Professor of the Principles of Surgery, Jefferson Medical College, Philadelphia. Octavo of 855 pages, with 359 illustrations, 17 of them in colours. W. B. Saunders Co., 1921, Philadelphia and London. Price with Volume VIII to be issued, and Revised Index, \$25.00 Sole Canadian Agents, The J. F. Hartx Co., Ltd., Toronto.

This volume may be briefly but accurately described as a compilation of the progress of surgical knowledge and achievement during the period of the great war. Much of this progress has been the direct result of the unique opportunities for clinical observation, and the consequent war, but this book is by no means to be considered as a Military Surgery. On the contrary, the endeavour of the authors is "to make available for the surgery of peace the lessons taught us during the war."

Chapters I to VII deal with Inflammation, Diseases caused by Animals, Insects and Reptiles, Anthrax, the Surgery of the Skin, Syphilis, Gas Gangrene and Tetanus. While each is excellent, special mention must be made of the magnificent illustrations in the chapter on Gas Gangrene, and to readers of THE JOURNAL unusual interest will attach to the article on Inflammation, by our old friend, John George Adami.

Chapters VIII to XII may be said to deal more particularly with Military Surgery, covering, as they do, The Organization and Administration of the Medical Departments of the Army and Navy in War, Surgery in a Fighting Ship, Traumatic Shock, and Traumatic Hysteria, including so-called "Shell-Shock." The concluding sentence of Chapter XII is of great interest, illustrating as it does the real nature of this condition, "Of 2,300 American soldiers suffering from shell-shock

more than 2,000 were cured by the news of the signing of the armistice."

Chapter XIII, on The Transfusion of Blood, is of great interest, and the one sentence, "When it is realized that in the British, French and American armies the method ultimately adopted was some form of citrate transfusion, it is evident that this means of blood transfer appealed to all as the simplest and most practicable for war purposes," illustrates a great lesson for civilian practitioners.

Chapters XIV, on The Bacteriology of War Wounds, and XV, on Surgical Technic with special reference to the Treatment of Infected Wounds, each contain much information of value, and cover the ground thoroughly.

Chapters XVI, on Fractures, and XVII, on Gunshot Fractures, deal fully with this subject, and describe the newer methods of treatment evolved during the war.

Wounds of the Nervous System, Injuries of the Spine and Spinal Cord, and Injuries of the Peripheral Nerves are fully discussed in Chapters XVIII, XIX and XX.

The experience gained and lessons learned during the war as to the Military Surgery of Joints is well discussed in Chapter XXI, and the advances made in Orthopedic Surgery in Civil Life are fully covered in Chapter XXII. One is pleased to note the references to Dr. Gallie's work, but it is unfortunate that through a typographical error his name should have been misspelled in the Bibliography.

The following chapter on Military Orthopedic Surgery, by Sir Robert Jones and E. W. Hey Groves, is a masterpiece such as one would expect from the distinguished authors, and the lessons taught should be of incalculable value in civilian practice.

The concluding chapter on the Surgery of the Vascular System is also a contribution of great merit.

Altogether it may justly be said that the high reputation of Keen's Surgery as a standard work on the subject will be further enhanced by this additional volume, the information contained in which is authoritative and in keeping with the last word in modern methods. E. R. S.

A MANUAL OF SURGERY. For Students and Physicians. By FRANCIS T. STEWART, M.D., formerly Professor of Clinical Surgery, Jefferson Medical College; Surgeon to the Pennsylvania Hospital. Fifth Edition, 1086 Pages and

590 illustrations. Published: P. Blakiston's Son & Co., 1012 Walnut Street, Philadelphia. Price, \$10.00. net.

To cover the whole field of Surgery, both non-operative and operative, including the surgical affections of the female pelvis, and excluding only the diseases of the eye, in a single octavo volume of approximately one thousand pages, is an undertaking of considerable magnitude.

That it has become necessary to issue a fifth edition of this volume illustrates how well the author has carried out his intentions as stated in the preface to the first edition, viz.: "The following pages have been prepared for the undergraduate whose crowded hours demand a manual stripped of verbiage and unessentials."

The work has been fully revised, and includes references to the most advanced ideas along many lines. It may be described as a complete compact, safe and authoritative presentation of the subject, which should be an excellent guide to the student, either before or after graduation.

The description of those operative methods, which the author has been instrumental in developing, and which are sometimes referred to by his name, *e.g.*, Amputation of the Breast, Gastro-Enterostomy, Subtotal Gastrectomy and the Radical Cure of Hernia, is particularly good, but due reference to and consideration of other methods is by no means neglected.

Where so much information is compressed into so compact a form it is obvious that the reference to many important matters must be very brief, but it would appear that more importance should be attached to the value of the Wassermann test in the diagnosis of syphilis, than is here accorded.

E. R. S.

INTERNATIONAL CLINICS. Thirty-first series, Vol. I. Edited by H. R. M. LANDIS, M.D., Philadelphia, U.S.A., with Medical and Surgical Collaborators in United States, England and Canada. 1921: J. B. Lippincott Company, Montreal, Que. Price, \$2.50 per volume, or \$10.00 for the series of four.

This quarterly of illustrated clinical lectures and original articles is well up to the standard set by previous volumes.

In addition to splendid articles in the departments of obstetrics, medicine, surgery, pediatrics and industrial medicine, there are two carefully

prepared reviews of the literature of 1920, that on medicine being done by Frank A. Craig, and that on surgery by John Speese. These occupy about one-third of the volume and make it a valuable work for the practitioner who wishes a careful view of the progress of medical and surgical science during the past year.

J. H. E.

PRINCIPLES OF BIOCHEMISTRY. For Students of Medicine, Agriculture and Related Sciences. By T. BRAILSFORD ROBERTSON, PH.D., D.Sc., Professor of Physiology in the University of Adelaide, South Australia. 633 pages. Price, \$8.00. Publishers: Lea and Febiger, Philadelphia and New York, 1920.

THIS volume is a praiseworthy attempt to accomplish a very difficult task, and the author has very measurably succeeded in achieving his object. The greater part of our knowledge of the processes, physical and chemical, of living matter and of its products, is of recent origin, for biochemistry as an independent science may be said not to have begun to win its place more than twenty-five years ago and, in consequence, there is as yet not the perspective that time alone can give, necessary to standardize adequately many of the more important results of biochemical researches which are of recent origin. It will take time, perhaps as much as ten years yet, to properly appraise and correlate many of the observations made in recent years and, therefore, the question may arise whether the emphasis that the author has given to certain subjects may be ultimately justified. This is more especially possible in consideration of the importance given by the author to the results ascertained in connection with the fertilization and early development of the ovum (pp. 446-470), which must be contrasted with the more or less scanty attention accorded to the subjects of anaphylaxis and immunity.

There are some noteworthy omissions of topics which are of importance to students of medicine, an example of which is amyloid (lardacein) of the pathologist to which there is in the text not a single reference.

The volume will, nevertheless, be of great assistance to the class of students for which it was designed and doubtless the author, who is a young biochemist of very considerable achievement as a researcher, will succeed in future editions in making it an exceedingly valuable standard text-book.

A. B. MACA.

RATIONAL TREATMENT OF PULMONARY TUBERCULOSIS. By CHARLES SABOURIN, M.D., Medical Director of the Durtol Sanatorium, Puy-de-Dome, France. Authorized English Translation from the Sixth French Edition, 440 pages. Philadelphia: F. A. Davis Company, 1921. Price, \$3.50, net.

HERE is a book without introduction or preface. The author has no apology for writing it nor the translator for translating it into English. It is a book with opinions based upon what appears to have been rather extensive opportunities for observation. It combines happily much practice with its theories. Many of the deductions are trite, some are expanded. The view point seems different from ours in Canada and yet the basis is the same. It is full of good common sense, very readable, and is attractive. It is a systematic treatise on treatment without appearing to be such. We welcome this book and feel it will appeal to English readers. J. H. E.

THE WASSERMANN TEST. By CHAS. F. CRAIG, M.D., M.A., F.A.C.S., Lieut.-Colonel Medical Corps, United States Army; Professor of Bacteriology, Parasitology and Preventive Medicine, and Director of Laboratories, Army Medical School, Washington, D.C. Second Edition, 279 pages, three coloured plates, ten illustrations and sixty-one tables. Published by the C. V. Mosby Co., St. Louis, U.S.A. Price, \$4.25.

IN this volume the author has produced a most excellent and thorough presentation of the Wassermann Test, considered from every angle. He refers to the discovery of the test, the nature of the reaction, and the factors which influence the result. His description of the preparation of the reagents used, while highly technical, is extremely exact, and must be of much value to the practical serologist.

The reasons he advances for his own modification of the original test are convincing, and it would appear that special importance should attach to the use of the antihuman hæmolytic system with a suspension of human corpuscles obtained from an individual belonging to Group IV of the Moss classification as a hæmolytic antigen, rather than a suspension of sheep corpuscles.

His chapters on the Interpretation of the Result of the Test, the Effect of Treatment on the Test,

the Use of the Test as a Control of Treatment, and the Value of the Provocative Reaction are most illuminating, and will convey much information of value to every student of syphilis.

The final chapter on the Wassermann Reaction on the Cerebro-Spinal Fluid is excellent, and includes practical directions for carrying out the Colloidal Gold, the Globulin and the Cell-Count Tests, with interpretations of the results.

The author should be congratulated on his work, and the book should be widely read, alike by the general practitioner, the specialist in venereal diseases, and the laboratory serologist.

E. R. S.

PRACTICAL PSYCHOLOGY AND PSYCHIATRY. By C. H. BURR, M.D. F. A. Davis Company, Fifth Edition.

The new edition of this Manual shows that it has been carefully rewritten and that a modern classification of mental diseases has been followed.

The book is eminently suited for use in teaching Insanity to junior students and for the use of training schools for nurses. A careful description of the physiological activities of the brain is followed by a full but not too deep account of the various mental changes that occur in abnormal states. The writer follows with an interesting account of Symbolism in Sanity and in Insanity, which is clearly a particular hobby of his own.

Part three deals with all the common types of Insanity, but not to the extent required by the specialist.

The final sections of the work are concerned with treatment, nursing, and finally, with a very valuable chapter on a subject usually neglected, namely, the prevention of Insanity.

The comparison of the life and the education of the boy of the last century, with the exhausting and unnatural life of today, is alone worth the price of the book. G. W. H.

PSYCHOLOGY AND PSYCHOTHERAPY. By WILLIAM BROWN, M.A., M.D. (Oxon), D.S.C. (London). London: Edward Arnold. Price, 8s. 6d.

This book is scientific and at the same time interesting from the numerous interesting clinical cases that are to be found throughout the volume, and which were collected during the author's war service.

As a well co-ordinated collection of the work of

different writers on the mechanism of normal and abnormal psychology, it is most excellently penned and is particularly useful to those who desire to obtain acquaintance with the views of such writers as Freud, Prince, Janet, Ribot, McDougall, Myers and Burgson, in a short time and with little study.

Disassociation of the Ego is well treated, with full discussion of the views of other writers in the opening chapters, which are followed by an able description of Freud's Theory of Dreams and of his views likewise on the Unconscious, while a fuller comparison of the theories of writers on Emotion is discussed to present Freud's views in a true perspective.

An excellent chapter on Psychotherapy is followed by a series of cases to exhibit its application in the world war.

The present spiritualistic outbreak in England is probably the reason of author's devoting the final chapters of his book to the Relation of Mind to Brain, which is thoroughly discussed.

Altogether one must congratulate the writer on the production of a most interesting and well arranged addition to the literature on mental problems.

G. W. H.

FUNCTIONAL NERVE DISEASE. Edited by H. CRICHTON MILLER, M.A., M.D. Late consulting Neurologist, 4th London General Hospital. 208 pages. Price, \$3.00. London: Oxford Medical Publications; Toronto: Mc-Ainsh & Co., Limited.

The plan followed in this volume was for a group of the younger physicians to each take up a separate subject bearing on the Functional Neuroses, and to discuss it, and then to arrange these papers in proper sequence.

Three articles on the physical side of the Neuroses are followed by four on Hysteria, by two on the Anxiety Psychoses and finally by three on treatment.

The basis of the book is along the Freudian lines, and the theories of Repression and Regression are discussed from the viewpoint of several groundpoints.

There is a very careful synopsis to each chapter, but this is a mistake, as it is very lengthy, and does not help the reader in any way.

The articles on treatment by suggestion and hypnotism are really valuable as giving the actual result of men who have used them very freely.

G. H.

SYPHILIS AND ITS TREATMENT. With Especial Reference to Syphilis of the Skin. By WILFRED S. FOX, M.A., M.D. H. K. Lewis & Co., Ltd., London. Price, 36s. net.

This volume of 195 pages covers the subject in a very understandable and easily read way, particular attention being given to the dermatological aspects of the disease. Many paintings of clinical cases are inserted, as well as many semi-diagrammatic cuts to illustrate clinical cases. The author does not seem to lay enough stress on the value of the dark field examination for the spirochæte, but describes more minutely the various stains used in demonstrating this organism. A description of the various forms of treatment is useful and is very sane and conservative.

Dr. Fox, while discussing the various public health aspects of the problem, favours the method of prevention by treatment of existing cases and by the free use of prophylactic ointment. He does not entertain the hope that the nation will suddenly improve morally.

D. K. S.

The Anatomy of the Nervous System. The Anatomy of the Nervous System, from the standpoint of development and function. By Stephen W. Ranson, M.D., Ph. D., Professor of Anatomy in Northwestern University Medical School, Chicago. Octavo volume of 35 pages with 260 illustrations, some of them in colors. Philadelphia and London: W. B. Saunders Company, 1920. The J. F. Hartz Co., Limited, Toronto, Ont. Cloth, \$7.25 net.

This is a most excellent anatomy of the Nervous System and will repay reading from the beginning to the end. It reminds one of Barker's original work on The Nervous System, but of course, is much more modern in its details.

It is especially valuable in its arrangement as it takes the reader gradually on from point to point and carefully describes each part of the Spinal Cord and Brain in natural sequence. The description is extremely clear, and the plates are excellent. The volume is suited for the anatomist and should also be in the library of every student of Neurology as a reference volume.

G. W. H.

The American Year Book of Anesthesia and Analgesia. Vol. II. 1917-1918. F. H. McMechan, A.M., M.D., Editor, pp. 483 and index. Numerous illustrations. New York, Surgery Publishing Company, 1920.

The exigencies and demands of the war are the editor's reasons for the late appearance of this volume of the year book. In both the science and practice of anesthesia and analgesia there are many controversial points which require careful investigation and study. In the year book a number of fundamental studies find their place and some of these are of exceptional merit. The advances made in these subjects in the surgery of war form some of the notable contributions, while the editor has been convinced that the handling of anesthesia and analgesia by the various allied Medical Services was not what it should have been. The army anesthetic methods which underwent considerable development and advances are now finding their application in civilian practice, and the articles in the year book should find a wide circle of readers, for the practice of anesthesia is rapidly becoming a specialty in the practice of medicine.

Local, spinal and sacral anesthesia receive due attention. Your reviewer feels he cannot in fairness select any of the essays and contributions for special mention where the standard of excellence is so high, but extends his congratulations to the editor and expresses the hope that the year book will meet with the success it deserves and secure the support necessary for its continuance. There is a full Bibliography of the pertinent literature and we find acknowledgment made to McGill Hospital Unit, Toronto General Hospital and this Journal for courtesies extended.

J. H. E.

Epidemic Respiratory Disease. The Pneumonias and other infections of the Respiratory Tract accompanying Influenza and Measles. By Eugene L. Opie, M.D., Colonel M.R.C., U.S. Army; Professor of Pathology, Washington University School of Medicine. Francis G. Blake, M.D., Major, M.R.C., U.S. Army; Associate Member of the Rockefeller Institute for Medical Research. James C. Small, M.D., for-

merly first lieutenant M.C., U.S. Army; Bacteriologist, Philadelphia General Hospital. Thomas M. Rivers, M.D., formerly first lieutenant M.C., U.S. Army; Associate in Bacteriology, Johns Hopkins University. pp. 402, 33 illustrations. Price \$6.50. C. V. Mosby Company, St. Louis, 1921.

This is a report of a commission appointed in July 1918, by the Surgeon General U.S. Army, to study the pneumonias prevalent in the army. Their observations were made at Camp Funston, Kansas, and Camp Pike. Their work covers the epidemic pneumonias of the summer of 1918, those associated with the severe epidemic of measles, and those complicating the influenza epidemic of the autumn of 1918. Some 979 cases of measles were studied, but as these cases occurred at the time of the influenza epidemic, the picture is modified by the presence of the latter. These two camps with their 50,000 men and high mortality, afforded an enormous amount of bacteriological and pathological material.

The authors conclude that the influenza epidemic of 1918 differed in no essential feature from that of previous epidemics and particularly the pandemic of 1889-90, and that the B. influenzae of Pfeiffer was constantly present. Noteworthy is the severity of the attack upon the bronchial passages; purulent bronchitis was present in 36 per cent. of the influenza cases and in all these the B. influenzae was found, always associated with some other organism, pneumococcus, S. haemolyticus, S. Viridans, M. catarrhalis, etc. In the pneumonias B. influenzae was present in 80 per cent. and the authors believe is to have been constantly present though not always isolated. Microscopic study of the bronchial walls demonstrated the marked destruction brought about by influenza leaving the tissues open to secondary invaders. In civil life, types I and II of the pneumococci are the causative organisms in two thirds of all cases, while in the influenza epidemic the lobar pneumonias showed an entirely different incidence, type IV 32.4 per cent., type II a typical 26.5, type III 17.6, type II 5.9, type I, 2.9, and no pneumococci in 14.7 per cent.

Streptococcus pneumonia, staphylococcus

pneumonia, the bronchopneumonias, pulmonary abscess, empyema, and the bronchiectasis so frequently found as a sequela of the severe bronchitis of influenza, are all fully discussed. The various organisms and their relation to the varied clinical and pathological findings are described with a wealth of detail which make the study a most valuable contribution to our knowledge of the respiratory complications of influenza.

The question of cross infection in the wards of a hospital receives attention and cases are given illustrating the recovery of a patient from a pneumonia due to one type of pneumococcus, only to develop another severe or fatal infection from a patient in an adjoining bed who had a pneumonia due to another type of organism.

There is a valuable summary of investigations and conclusions which contains much that should be of value to army and civilian hospitals in the presence of another epidemic of acute respiratory disease.

The illustrations are splendid, and the press work of the best. We congratulate the authors upon their excellent presentation of their material and the conclusions therefrom. Their work must have been done under great stress and strain as was all work in those hospitals caring for influenza when the epidemic was at its height.

The book deserves to be widely read.

J. H. E.

On Diseases of the Lungs and Pleurae, including Tuberculosis and Mediastinal Growths. 6th Edition. By Sir R. Douglas Powell, Bt., K.C.V.O., M.D., and P. Horton-Smith Hartley, C.V.O., M.D. Pages XX-798, 36 plates and other illustrations. H. K. Lewis & Co. Ltd., 28 Gower Place, London, W.C.I. 1921.

It is twenty eight years since Sir Douglas Powell brought out this volume originally, and now nine years after the fifth edition, we have the sixth edition in which Sir Douglas has had the collaboration and assistance of Dr. P. Horton-Smith Hartley. Some of the articles have been somewhat condensed, while new chapters have been added on Gunshot Wounds of the Chest, Chylothorax, Massive Collapse of the Lung, Sporotrichosis, and

Artificial Pneumothorax. The chapter on "some essential points in the Anatomy and Physiology of the Lung" is well written and forms a splendid introduction to the text dealing with disease, as do the succeeding chapters on physical examination. In these latter the mechanism of the production of the various physical signs elicited in health and disease are discussed, and this is most helpful to the earnest student and discerning physician.

In the chapter on Asthma the recent work of Freeman and Walker on the part played by proteins in the causation of Asthma receives due mention. There is but one little reference, however, to the technique of testing out protein sensitization.

Approximately two fifths of the volume is taken up with the subject of pulmonary tuberculosis, much of which has been revised.

The book is a splendid summary of the best British thought in the etiology, diagnosis and treatment of pleural and pulmonary diseases, both acute and chronic, and is particularly pleasing in its insistence upon, and repeated demonstrations of, the great clinical value of careful history taking and physical examination as the basis of all diagnosis. Like the related works of Samuel West and the classic of Fowler and Godlee, this book in its former editions has made a place for itself in British practice.

Though not detracting from the real value of the book, there are numerous scattered evidences of careless proofreading which we do not care to see in such a splendid work, and we would suggest that plates such as figures 6 and 7 (from Quain) and 8 and 9 (modified from Merkel and Thane) would be improved if they indicated the range of movement of the lower border of the lungs, instead of depicting them as in fixed relation to certain ribs.

Our one great disappointment is to find so little value placed upon careful X-ray study of the thoracic diseases and particularly the way in which the stereo-roentgenogram is passed over in almost complete silence. In Canada and the United States we have learned to look upon this field of study as adding greatly to our means not only of diagnosis, but of ascertaining the extent and location of various lesions within the chest. We trust

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J. H. E.

Practical Tuberculosis, a book for the general practitioner and those interested in tuberculosis. By Herbert F. Gammons, M.D., Superintendent Woodlawn Sanatorium, Dallas, Texas. Introduction by J. B. McKnight, M.D., Superintendent and Medical Director, Texas State Tuberculosis Sanatorium. Pp. 158, 11 illustrations. St. Louis, C. V. Mosby Company, 1921. Price \$2.00.

This small book is probably well conceived, but so badly executed as to warrant its withdrawal by the publishers. Murdered English, misleading half truths, and careless statements abound throughout it, and quite spoil a book which contains much of merit. Some sentences which could be multiplied beyond the space available to the reviewer, are here presented "he (the examiner) must be able to hear and have a stethoscope that is comfortable to the ears and auditory canal". "It is very evident that a physician would have a very poor practice, who did not have at least twenty tuberculosis patients under his supervision each year". "In nearly all adults one will find fine crackles in the lower axillary region on deep inspiration; naturally one should be suspicious of tuberculosis in these cases". "The diseased voice transmission is very variable". "Exaggerated resonance is usually an indication of emphysema". "Neuritis is a frequent complication of tuberculosis even in the early stages, and we must consider the possibility of all neuritis attacks as resulting from

tuberculous infection". "Blow-ups in tuberculosis are considered due to **extension of the bacilli** through the lymphatics". "Inspiration is voluntary, while expiration is due to the elasticity of the lung tissue and also to the contraction of the chest muscles and diaphragm". "In the healthy adult male about 20 c.c. of air are introduced into the lungs and bronchial tubes during each inspiration". "Coughing usually results from an irritation in the laryngeal passages". "Tuberculosis patients often lower their temperature by exercise". Vaccination has often lit up tuberculous infections". "Do not forget that Nature has cured many tuberculous persons, and that medicines, vaccines and serums have killed more patients than they have cured". "Resorting to the use of opiates should be delayed as long as possible, **because frequently opiates prolong the life** of these hopeless incurable cases, who have an impaired mind which causes them and their associates much discomfort".

He states that artificial pneumothorax should be given by a specialist, yet goes on to describe the operation in such a manner that if an attempt were made according to his directions, disaster would almost surely follow.

After making a good statement of the value and limitations of the x-ray in diagnosis and pointing out that only good plates are of value, he uses for illustration some four plates whose lack of detail make them as valueless as those he decries.

The names of men prominent in the history of medicine and tuberculosis are frequently mis-spelled and the legends under the illustrations show great carelessness in writing and typography.

There is no excuse for the appearance of a book full of such glaring defects and mistakes.

J. H. E.

